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Successful UV Installation

October 10th, 2016

Purpose: **Call for Abstracts** for 2017 Trenchless Technology Road Show - September 25 to 27, 2017

Outline for a successful UV Liner Installation

- I. Project Awarded
- II. Pre-Planning
- III. Prior to Mobilization
- IV. Mobilization
- V. Day of the Job
- VI. Job Completion and Finishing
- VII. Specifications

Devil is in the Details

I. Successful Bidding process

II. Pre-Planning

- A. Verify lengths and sizes of pipe
- B. Use wheel for above surface measurements
- C. Measure both inlet and outlet sizes to insure diameter is consistent
- D. Schedule a Pre-Con meeting to discuss any potential issues or changes
 1. City, Owner and Engineer

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E. Pre-Clean (heavy)

1. Pre-clean and CCTV prior to material order (Unless confident of line conditions)
2. This is initial heavy cleaning= debris and root removal

F. Material Ordering

1. Order Liner from preferred or specified manufacturer
2. Take delivery of material
3. Check delivery for damage
4. Open box
5. Safety caps
6. Is lining size correct
7. Glide Foil
8. Do you have the Manufacturers installation chart?
9. Correct length
 - a) Odors- Is there excessive styrene odor, this could be an inner foil problem

G. Glide Foil

1. Typically used on runs >600 lf
2. Used also when excessive roughness is realized

H. Notification & Permits

1. Pull Permits
2. Traffic control
3. Community notification

III. Prior to Mobilization

A. Pre-Check

1. Blower, vanes & or rotary
2. CCTV
3. Lamps and illumination
4. Cable drum
 - a) Check fitting and spring calibration
 - b) Use steel tape & double check & record pull speed
5. Jetter truck
6. Ratchet straps
7. Hand tools
 - a) Angle grinders
 - b) Chipping hammers
 - c) Cutting equipment
8. Robotics
 - a) Reinstatement cutters
9. Constant tension winch
 - a) Constant tension winch or hand pull
 - b) Winch and conveyor
 1. Synchronization of potentiometers that work in conjunction, push/pull timing
 - c) ***Do not use PTO-** changes speed based on load

10. Correctly sized and clean packers

a) Freeze flux tape

1. Maintained properly should produce 4-5 packer uses

11. Bypass

a) Hose

b) Plugs

c) Discharge

12. Huge Bypass Flows

a) Bigger the flow the more complicated

b) If unsure, consult a Fluid Dynamics Specialist

c) Self-priming pumps and using polyethylene pipe is a complicated mathematical equation that must be taken seriously

13. Bypass has its advantages

a) This could be an area of “competitive edge”

b) Complicated or complex situations could give you an advantage if your pre-planning and setup is discussed

c) View the geography of the installation site

d) Learn to be creative

IV. Mobilization

A. Be organized

1. Will you be traveling from home base daily?

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2. Are you better off utilizing a satellite office?
3. Proper cleanup provides for prepared performance
4. UV Truck should be organized and equipped for upstream installation (unless it is a downstream setup)
5. Support vehicle should be equipped for downstream operations
6. This prevents constant commuting between vehicles for tooling
7. Everything you need should not be in between the vehicles, excessive labor is lost profits

V. Day of the Job

A. Pre-site safety

1. Point out site hazards
2. Setup your safety perimeter
3. Proactive mitigation of injury

B. Setup

1. Traffic perimeter
2. Bypass setup
 - a) Test bypass before it's in the ground

C. Cleaning & Camera

1. Camera to follow jetter
2. Camera has rope/cord attached and provides downstream delivery
3. Attach rope to cable and pull through host pipe

- a) Glide foil is mechanically attached to cable and pulled through simultaneously
4. Cable is attached downstream to liner and drawn in using winch or man power (<15’)
5. Cut liner to pipe size and leave 2’ past for packer installation
6. Pack it, install packer downstream
 - a) Band liner to packer using ratchet straps or banding equipment (be careful using banding equipment this could cut the liner)
 - b) Ratchets are reusable!
7. Inflation
 - a) Inflation from downstream to upstream
 - b) You could run hose to downstream
8. Light train
 - a) Remember, prior to light train insertion to connect cord to twine and pull cord through
 - b) Connect rope/cord to front of light train. Insert train into pre-inflated liner, be careful of wheels and inner foil during installation
 - c) Train will not fit through packers/cans 6”-15”
 - d) Liners 15”-64” a sloose is typically used
 1. Sloose is attached over the can/packer and inflated

- e) Once light train is in place and pigtail has passed through the packer, button up the upstream packer
- f) Inflation typically starts during the buttoning up of the upstream packer
- g) Once 50mBar is achieved cut ½ slits at both end and also in each intermediate manhole.
- h) Cuts/Slits
 - 1. Check these for air passage, allows entrapped air to escape
 - 2. This should not be excessive, but a *slight* breeze is possible
- i) 50 mBar
 - 1. once this is achieved, safety first and everyone should exit the manhole

D. Inc by Inc

- 1. Manufacturers installation chart will provide the incremental increases and rest times to ensure proper inflation
- 2. You've reached it! The Target mBar (psi) desired for installation!!
- 3. Hold it, 10 minutes is typically the target number for pressure hold

E. The light train

- 1. Pressure is good

2. Train is on time
3. Pre-inspection is the first stop; we can see it before we cure it.
4. Looks good
5. Start the illumination

F. Operator

1. Operates
2. Visual inspection
3. Every foot is documented
4. Exothermic temperatures provide that our curing process is functioning and curing properly
5. Train has reached the station

VI. Job Completion and Finishing

A. Almost done

1. Upstream Packer is removed
2. 15 minutes of air is run through the line
3. Light Train is removed (Carefully)
4. Downstream packer is removed
5. Cord from front of light train is knotted and tied to the inner foil for removal
 - a) Make sure this is tied securely and properly
 - b) Start pulling of cord from upstream to downstream
 - c) If inner foil breaks and or is bunched, you could try from the opposite end

- d) Tricks of the trade: all bunched up with no place to go?
- e) Fill upstream manhole, still on bypass) with water,
downstream is open and ready, have a screen for the catch.
Gravity/pressure could assist if pushing out the bunched
inner foil
- f) Note** this is all done prior to lateral reinstatement, don't
try this at home!

6. Post

- a) Post clean
- b) Post CCTV
- c) Grout if specified
- d) Lateral liner installation

VII. Specifications

A. Design requirements

- 1. What is this liner designed to provide?
- 2. Liner loading specs
- 3. Experience requirements
- 4. Who is my competition
- 5. Hopefully it's a UV only spec
- 6. Watch and review your drawings closely for a competitive edge
- 7. Keep an eye out for multifaceted specifications

8. When discussing a project with an engineer it may be good to point out the advantages to provide all rehabilitations at the time of service, this way there is no reason to revisit in the near future!