Trenchless Technologies Buffett

Slip Line Pipe Rehabilitation

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What is Slip Line Pipe Rehabilitation?

- Trenchless method of inserting a smaller new pipe into a larger existing host pipe.
- Generally a fully structural end product.
Applicability

- Water, gravity sewer, pressure sewer, storm drain.
- Wide range of pipe sizes.
- Maintain or reduce capacity of existing pipe.
- Ability to excavate and expose pipe at key locations.
- Most cost effective for:
  - Long straight sections of pipe.
  - Minimal lateral connections, valves, bends, etc.
  - May be possible to maintain service in gravity piping.
Construction Process

- Inspect, clean and prepare existing pipe.

- Create access point to existing piping.
  - Excavate lining pit at bends, valves, etc.
  - Place pressure pipe out of service.
  - “Proof” slip line section with template.
Construction Process

- Insert Pipe.
  - Pull continuous pipe.
  - Push segmented pipe.

- Fill annular space/seal access points.
- Backfill and restore.
Design Considerations

- Existing Pipe Configuration.
- Lining Pit Size and Location.
- Capacity.
- Liner Pipe Materials.
  - Push Segmented Piping: Fiberglass Reinforced Pipe, DIP, PVC.
  - Pull Continuous Piping: HDPE, Fusible PVC.
- Liner Pipe Thickness or Strength.
  - Pushing or pulling forces.
  - Gravity Piping: consider hydrostatic groundwater pressure.
  - Pressure Piping: consider both internal and external stresses.
Other Trenchless Rehabilitation Methods

- CIPP
- Pipe Bursting
- Modified Slip Line
- Laminate/Composite Liner
- Emerging Technologies
Example Project: **City of St. Cloud Sewer Interceptor System Rehabilitation - Phase IV**

- Rehabilitation of 1.7 miles of existing 54-inch and 60-inch corroded RCP sewer interceptor pipe.
City of St. Cloud Sewer Interceptor System Rehabilitation - Phase IV

**Project Goals**

- Fully structural solution.
- Maintain existing capacity.
- Minimize excavation.
- No service disruption.
City of St. Cloud Sewer Interceptor System Rehabilitation - Phase IV

Challenges and Risks

- Busy traffic areas.
- Sewer flows up to 9 MGD.
- Depths of 30 feet or more.
- Tight fit between new and existing pipe.
City of St. Cloud Sewer Interceptor System Rehabilitation - Phase IV

Rehabilitation Methods Chosen

- **Slip Line** 7,800 feet of 60-inch and 54-inch RCP.
- **CIPP** 1,200 feet of 60-inch RCP.
City of St. Cloud Sewer Interceptor System Rehabilitation - Phase IV

Slip Line

Picking up pipe segment.
Slip Line

Lowering pipe into pit.
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Slip Line

Stabbing joint.
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Slip Line

Pushing pipe string.
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CIPP

Liner installation.
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CIPP

Bypass pumps and piping.
City of St. Cloud Sewer Interceptor System Rehabilitation - Phase IV

**Takeaways**

- Inherent risks associated with fitting new pipe in old pipe.
- Pipe geometry and flow data essential to inform design decisions.
- Coordination between all stakeholders paramount.
- Contractor should determine means and methods where practical.
- Consider staging areas.
- Safety first *and last.*
Thank you!

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