SEWER TELEVISING & REPAIRS

Adam Tierney
Business Development Manager
Northern Pipe, Inc.
AGENDA

• Purpose of CCTV Inspections
• Equipment
• NASSCO (National Association of Sewer Service Companies)
• Inspection Checklist
• Infiltration
• Rehabilitation
Purpose of CCTV Inspection

• Mainline Sewer
  • Identifies the current condition of the mainline sewer to determine if repairs are required to remain in service

• Private Laterals
  • Required to determine condition of private laterals and identify necessary repairs.

• CMOM Specifications (Capacity, Management, Operation and Maintenance)
  • Required to abide by CMOM Specifications

CCTV Operator Specifications

• Pipeline Assessment Certification Program (PACP)
• CCTV Software must be NASSCO-PACP certified
WHAT IS CMOM?

• Protects the Capacity of the collection system to convey wastewater

• Manages the system cost-effectively

• Operates the system efficiently

• Maintains the system to prevent problems

• Better manage, operate and maintain collection systems!
EQUIPMENT

Sewer Mainline Camera

Pan & Tilt capability

Lateral Inspection

Simultaneously inspects mainlines and laterals up to 150 feet
NASSCO (PACP) SPECIFICATIONS

PACP Pipeline Assessment Certification Program

- North American Standard for pipeline defect identification and assessment
- The accepted method for municipalities, contractors, consultants and manufacturers to record and track sewer pipe defects and assess the condition of infrastructure

PACP documents four areas of defects:

- Structural — defects where the pipe is damaged or otherwise defective.
- Operation and Maintenance — types of foreign objects found in pipes that may interfere with the operation of the conveyance system.
- Construction — features and conditions associated with the methods used to construct and connect to pipes.
- Miscellaneous — general features and defects that are not described by or included in other categories.
**Televising Process Specifications**

- The speed of travel should be slow enough to inspect each pipe joint, tee connection, structural deterioration, infiltration and inflow sources, and deposits.
- Televising speed should not be faster than 30 feet per minute at any point.
- The camera must be centered in the pipe to provide accurate distance measurements. This provides exact location of important features in the sewer.
- Footage measurements must be displayed & documented on the video.
**Televising Process Specifications**

- Every section of sewer (manhole to manhole) must be identified by audio and alphanumeric on the video display.

- Important features shall be identified by audio and on PACP log to include all:
  - Manholes, active and inactive service connections, structural defects, maintenance problems, grease, roots, infiltration, obvious inflow sources, etc.

- Documentation:
  - Project Name
  - Municipality
  - Street Name
  - CAGIS manhole numbers
  - Inspector’s name
  - Sewer diameter and length
  - Date of Inspection
# Inspection Report

## Survey Details

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### Downstream Manhole

Downstream manhole was not labeled or marked provided.

## Inspection Details

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Starting Manhole: MH 1752 / Block 5
Construction - Fair Condition (2 open pick holes in cover)

SO1 defect starts
FO1 Defect Ends

**End of inspection at MH 7 / Block 5 construction - Fair condition (2 open pick holes in cover).**
PACP Segment Grading

5 Immediate Attention Needed
4 Poor - Will Become Grade 5 in Near Future
3 Fair / Moderate
2 Good - Has not begun to deteriorate
1 Excellent - Minor defects
**Manhole Inspection Takeaways**

- **Structural**
  - Construction type
  - Frame condition
  - Subject to ponding

- **Operations & Maintenance**
  - Flow in manhole
  - Blockages
  - Contamination

- **Inflow & Infiltration**
  - Evidence of Infiltration
  - Degree of Infiltration

Precast Concrete Manhole
**What is Inflow & Infiltration?**

**Inflow**
- Storm water that enters into sanitary sewer systems at points of direct connection to the systems.

**Infiltration**
- Groundwater that enters sanitary sewer systems through cracks and/or leaks in the sanitary sewer pipes.
- Cracks or leaks in sanitary sewer pipes or manholes may be caused by age related deterioration, loose joints, poor design, installation or maintenance errors, damage or root infiltration.

*If ignored I&I could cost the community millions of dollars*
Rehabilitation & Trenchless Repairs

- **Slip Lining** - slipping a smaller diameter pipe within the larger damaged pipe and sealing the annular space.

- **Cured-in-Place-Pipe (CIPP)** - a sturdy liner placed inside a pipe rather than a pipe within a pipe.
  - The main advantage of this method is that the flow rate of the original pipe is not affected.

- **Spot Repair** - a method of trenchless rehab that eliminates the need for pipe replacement.
  - Spot repair is often sufficient and can save money over replacement.

- **Grouting** - grouting is the process used to seal a crack or leaking joint in underground piping.
  - To prevent the flow of groundwater into the pipe or to keep the material in the pipe from flowing into the groundwater.
Municipal Grouting
Sanitary Sewer Pipe

How many feet of sanitary sewer pipe are in the United States?
Sanitary Sewer Pipe

There are over 5 Billion feet of sanitary sewer pipe in the United States with more being installed daily.

= to the moon and back, TWICE

= 38 times around the earth

The number of Manholes in the US is estimated to be between 30-40 Million.
Inflow & Infiltration

- Inflow is surface water
- Infiltration is groundwater

The EPA estimates Inflow & Infiltration accounts for approximately 50% of the water entering treatment plants.

-United States Environmental Protection Agency; Office of Research and Development, Washington DC 20460 EPA/625/R-961007
The Effects of Infiltration

Flooding of local sewer lines, streets, and roadways

Increased treatment costs

Reduced life of pumping and treatment units/equipment

 Depositing of soils within system resulting in a loss of collection system capacity.

Increased risk of Sanitary Sewer Overflows (SSO) resulting in fines

Sinkholes
Sinkholes
Houston, TX

Houston April 29, 2013:
610 feeder near 288 (Holt St.)
“30’ wide, 15’ deep…..
Due to an 8” sewer pipe”
(NBCnews)
Houston, TX
Process of Sewer Failures

**Stage 1:** Initial infiltration, sewer remains supported by surrounding soils.

**Stage 2:** Loss of soil fines resulting in voids and loss of pipe alignment.

**Stage 3:** Extensive damage or failure of sewer pipe.
Points of Infiltration

Mainlines, Taps, Laterals, and Manholes
How Do We Stop Infiltration?

Chemical Grout
What is Chemical Grout?

A liquid resin which turns into an impermeable solid in a predictable time frame.

Chemical Grout is the **ONLY** rehabilitation technology specifically designed to stop infiltration.
Types of Chemical Grout Used to Eliminate I&I

- **Acrylics**: Chemically reactive gels
  - Acrylamide
  - Acrylates

- **Polyurethanes**: Moisture or chemically reactive foams and gels
  - Hydrophilic
  - Hydrophobic
Chemical Grout Uses

- Stopping leaks in above grade structures
- Stopping infiltration into below grade structures
- Stabilizing soils
- Groundwater mitigation
- Filling Voids
- Lifting settling structures
Where are Chemical Grouts Used?
Subways & Tunnels
Mines & Tailings Dams
Concrete & Earthen Dams

Protecting the world’s dams is an on-going significant endeavor. Avanti’s grouts have been used in many dams to stop water leaks and help maintain the integrity of the structure.
Underground Structures
Soil Stabilization
Hazardous Waste Containment
Mainlines, Taps, Laterals, and Manholes

Collection Systems

CHEMICAL GROUT STOPS LEAKS AT THE FOUR CRITICAL POINTS OF ENTRY
Typical Mainline & Lateral Grouting Setup
Mainline Joint Sealing
Tap and Lateral Joint Sealing
Lateral Push Packers

When a cleanout is present, lateral push packers allow for complete grouting of laterals between host pipe and cleanout.
Grouting & Lining

- **Grout**: Non Structural, Stops Infiltration/Exfiltration
- **Lining**: Structural, Reallocates Infiltration

- Injection Grouting and Lining are complementary technologies – **Not Competing Alternatives**
Grouting and Lining
Lining Reallocation Infiltration to Service Connections

Leakage Between the Liner and Host Pipe
Same Connection Following Grouting
Inflow & Infiltration Contribution and Costs

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<td>Cost of Rehabilitation</td>
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<td>SERVICE LATERALS</td>
<td>30</td>
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<tr>
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Sealing System Structures

Manholes, lift stations, utility vaults, and detention systems are vulnerable to infiltration through cracks, pipe penetrations, mortar joints, barrel joints, faulty seals, pick holes, and cold joints.
A one gpm leak contributes 525,600 gallons/year
(50) 1 gpm leaks = 26,280,000 gallons/year

At today's avg. treatment cost of $3 per 1000 gallons
(50) 1 gpm leaks add $78,840/yr to treatment costs.
Average infiltration repair cost per manhole is only $500-$1,200

Worst Case Scenario 50 manholes at $1,200/manhole = $60,000
How about $18,000 yr 1 and nearly $80K following for a ROI?
Barrel Joints
Point Repairs
Curtain Grouting
THE ROLE OF CHEMICAL GROUTING IN WASTEWATER SYSTEMS:
How to Reduce I&I and Prevent Structural Damage with Intelligent Use of Chemical Grout

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THANK YOU!
Questions?

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Avanti
Stop leaks. Stabilize soil.
Control groundwater.
Permanently.