National Association of Sewer Service Companies (NASSCO)

Introduction to NASSCO & Its Role in Post Installation Inspection of Storm Sewers
Is This Topic Relative to Needs

- ACPA keenly aware of importance & Supports Stringent Post Installation Inspection (PII) of New Storm Piping
- Advanced Video, remote measurement tools and Robotic delivery systems are becoming Common Place
- Advanced Systems – MUST HAVE PROPERLY TRAINED TECHNITIANS & ENGINEERS
- NASSCO CAN BE AN IMPORTANT LINK TO INSURE TECHNITIANS and THEIR EQUIPMENT and REPORTING SOFTWARE SYSTEMS MEET THE NEEDS of STORM SYSTEM OWNERS
- LET'S TAKE A CLOSER LOOK @ NASSCO
NASSCO

- What is NASSCO
- Training Programs of NASSCO
- Pipeline Assessment and Certification Program (PACP)
- Anticipated PACP Improvements
- Introducing PACP to DOT’s and AASHTO
NASSCO Overview

• “NASSCO, the National Association of Sewer Service Companies, is committed to setting industry standards for the rehabilitation of underground pipelines, and to assure the continued acceptance and growth of trenchless technologies.”

• “NASSCO was formed in 1976 with one goal in mind: To improve the success rate of everyone involved in the pipeline rehabilitation industry through education, technical resources, and industry advocacy.”

• [http://www.nassco.org/index.html](http://www.nassco.org/index.html)
Major Training Programs of NASSCO

• “Our goal is to **standardize procedures** to ensure that in the future each and every rehabilitation project is a success.”

  ▪ **Pipeline Assessment and Certification Program (PACP) program.**
  ▪ **Manhole Assessment and Certification Program (MACP)**
  ▪ **Lateral Assessment and Certification Program (LACP)**
Pipeline Assessment and Certification Program (PACP)

• PACP provides a standard and consistent way to evaluate sewer line condition and a way to manage the Video Data Collected
  ▪ Development of Std. Codes
  ▪ Training and Certification of Users
  ▪ Std PACP Data Format in Software maintained

▪ [http://www.nassco.org/training_edu/pdfs/editorial.pdf](http://www.nassco.org/training_edu/pdfs/editorial.pdf)
Pipeline Assessment and Certification Program (PACP)

- Standard reporting (CODES) for pipeline conditions
  - Structural Defects/Condition
  - Operation & Maintenance Conditions
  - Construction Features
  - Misc. Features
  - Condition Rating of Pipeline
  - Currently = Visual Interpretation of observed Conditions – focus is on aged Sanitary Systems

- Two Day Training Course to obtain Certification
- Since Inception in 2002 - 10,000 Tech., Operators, Inspector/Designers are PACP Certified
- Many municipalities require PACP Cert. – Codes be used for Pipeline Condition Assessment
- Data Collection/Reporting Software – Must be PACP Certified

- [http://www.nassco.org/training_edu/pdfs/pacp-macp_overview.pdf](http://www.nassco.org/training_edu/pdfs/pacp-macp_overview.pdf)
History of ACPA Involvement w/NASSCO

• RCP Reps. obtain PACP Certification - 2008
• ACPA – NASSCO Task Group Formed - 2008
• Task group meets with PACP Decision Makers to discuss how NASSCO & PACP can meet needs of DOT PII programs - 2008
• ACPA Joins NASSCO as Professional Member in 2008
• Attended NASSCO Annual Meeting 2008
  ▪ Relationship Building
  ▪ Began conversation w/NASSCO PACP Committee – How PACP could/needs to be more relative to Storm Water Piping Community, DOT’s, AASHTO
  ▪ Presentation to Board of Directors of NASSCO to request and discuss how they could possibly bridge knowledge and training gap for DOT’s & Muni’s involved with Advanced Video PII around country.
  ▪ Board approved and agreed to address storm drainage and additional condition coding to PACP
• Attended Annual Meeting 2009
  ▪ Plastic Pipe Industry rep. presents their concerns and thoughts about additional condition coding presented by ACPA in 2008 for flexible pipe and voiced their general support for updating the PACP program
  ▪ Approval by Infrastructure Committee and continued NASSCO Board Support to have required revisions made and included in PACP Program by June of 2010!
Requested PACP Updates

- Why the new Codes for & Information on Storm Water Piping:
  - Need #1 - More Storm Drain Product info – RCP, CMP, HDPE, needs to be included in PACP Training PP & Manual & Tutorials
  - Need #2 - Additional Coding to be included in PACP for storm drain installations to satisfy National Post Installation Inspection Criteria & Various State Department of Transportation that require Post Installation Inspection of New Storm Pipe Installations before acceptance into state roadway system.
  - Need identified by various pipe type manufacturers in 2008 to revise PACP to include new Codes & measurements as required in new Specs. around country

- There is a NEED for training/resources?
  - Yes There is a need NOW, and the need will continue to grow in the future
  - NASSCO is the organization that can help and PACP Training can and will answer the need for training of inspectors, engineers, and contractors
Anticipated Updates & Improvements to PACP

• Additional Pictures and Information for most prevalent Storm Drainage Products

• Additional Codes to better address current Storm Drainage Products…. Deformation (Deflection & Inverse Curvature), Buckling (Wall Buckling & Wall Dimpling)

• Software updates to allow measurements of some condition code items…Crack Width & Length, Joint Gap widths, % Deflection
PACP-AI
Advanced Inspection Module

Updates to PACP to include additional Storm Sewer Piping Products and additional condition codes required!
Module 6A
Structural Defects
Section 5 Reference Manual
Structural Defects

12 groups, as follows:

• Crack (C)
• Fracture (F)
• Broken (B)
• Hole (H)
• Deformed (D)
• Collapse (X)

These six defects define progressive degrees of possible pipe structural condition

……...continued on next slide
Structural Defects (Cont’d)

- Joint (J)
- Surface Damage (S)
- Weld Failure (WF)
- Point Repair (RP)
- Brickwork (B)
- Lining Failure (LF)
Crack (C)
Definition

• A crack is a break line that is visible on the surface and:
  ▪ is *not* visibly open;
  ▪ the pieces of pipe are still in place.

In brick sewers crack lines are visible in the brickwork and/or mortar but the bricks are still in place.
Crack (C) Descriptors

- **Circumferential (CC)** — around the circumference of the pipe
- **Longitudinal (CL)** — down the length of the pipe
- **Multiple (CM)** - a combination which cannot be coded separately
- **Spiral (CS)** - helically around the pipe in a corkscrew pattern
Crack Longitudinal

Use where the crack is continuous, over three feet or one meter in length.

Values may be used if measurement required by agency/owner

Not used

One clock reference should be used to record the location of crack longitudinal

Used when crack is within 8” or 200 mm of a joint
Crack Longitudinal (CL)

<table>
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<tr>
<th>Distance (Feet)</th>
<th>Video Ref.</th>
<th>Code</th>
<th>Continuous defect</th>
<th>Value</th>
<th>Joint</th>
<th>Circumferential Location</th>
<th>Image Ref.</th>
<th>Remarks</th>
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Deformed (D)

Definition

• The pipe condition/shape has been altered to the point that the original cross-section of sewer is altered. For flexible pipes (metal, HDPE, PVC, SRHDPE) this condition is commonly identified/defined as vertical deflection.

• It is possible to have deformation without loss of visible structural integrity in flexible pipes such as plastic, pitch fiber pipes, metal, etc. Additional structural defect coding should be continued for flexible pipes. Flexible pipe systems are expected to deflect to allow proper soil to pipe interaction. However, excessive deflection of flexible pipes is a sign of structural distress.

• Care must be exercised when using these codes in brick sewers. Brick sewers are sometimes not built to regular sizes and were frequently built to suit local site conditions.

• If Deformation occurs in brick sewers or other rigid structures such as clay or concrete, no other Structural defect codes are required unless the deformation is at a point repair. Other defects such as O&M and Construction Features should be coded as usual.
Deformation Group/Descriptor Code

• **Deformed/Deflection (D)**- Used for pipe sewers
  - Rigid Pipe (D) = Original shape Altered
  - Flexible Pipe (DD) = Visible Deflection of 5% or greater or Measured deflection exceeding 3%
Deformation
Group/Descriptor Code

- **Inverse Curvature (DI)** - inward projection (heart shaped) of the pipe wall
Estimate vertical and / or horizontal change as a percentage of the original diameter / height and give it as a percentage in increments of 5%.

Use where deformation is continuous, over three feet or one meter in length.

Not used, except for inverse curvature.

Not used.
# Deformed (D) Rigid Pipe Examples

<table>
<thead>
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<th>Distance (Feet) (metres)</th>
<th>Video Ref.</th>
<th>Code</th>
<th>Continuous defect</th>
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### Deformed (DD) Flexible Pipe Examples

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<th>Code</th>
<th>Group/Descriptor</th>
<th>Modifier/severity</th>
<th>Continuous defect</th>
<th>Value</th>
<th>Joint</th>
<th>Circumferential Location At/From</th>
<th>Image Ref.</th>
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Inverse Curvature (DI)
Buckling (K) Definition

- **Buckling (K), (KW)** - the out of plane deformation in the pipe wall.
- **Dimpling (KD)** - the wavy pattern or inward bulging that occurs in the inner wall of the pipe due to local instability of the wall.
### Dimpling (KD)

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## Wall Buckling (KW)

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<th>Distance (Feet)</th>
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<th>Code</th>
<th>Continuous defect</th>
<th>SM/L</th>
<th>Value</th>
<th>Joint</th>
<th>Circumferential Location At/To</th>
<th>Image Ref.</th>
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NASSCO Reaching out to DOT’s and AASHTO

- ACPA is providing supportive assistance to help NASSCO build relationships and identify needs of the DOT and AASHTO Communities:
  - Provided NASSCO with current DOT PII Specs.
  - Helping NASSCO identify DOT contacts to insure updates to PACP will meet needs of DOT’s
  - Trying to get PACP Certified Tech. for PII Specs. in DOT Specs.
  - Encouraging DOT’s to obtain PACP Training
  - NASSCO has submitted request to be included on presentation Agenda @ AASHTO Bridge, AASHTO Const., & SASHTO Meetings this year!
  - Currently our Main NASSCO Contact is Mr. Gerry Muenchmeyer, NASSCO Technical Director
Review – Conclusion - Questions

• Monitor PACP Updates – Use Caution until PACP Revisions Confirmed – Untimely to promote PACP before Changes Made
• Review NASSCO Website NASSCO.org
• Consider Becoming PACP Certified
• Attend NASSCO Pres. @ AASHTO
• Questions