ASHE Phoenix Sonoran

Post Installation Inspection - Value Assurance

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Rinker Materials

American Concrete Pipe Association

Who is this Guy?

31 Years in Construction Materials & Products

- President AZ Precast Concrete Pipe Assoc.
- Registered AZ PE
- 6 years Exec Director AZ Cement Assoc.
- Provided forensics reports on plastic pipe failures
- Const Matls Insp & Test Dept Mgr – Terracon

- *23 year focus on CMP, HDPE, PVC & RCP, working for manufacturers of each*

Today's Discussion Topics

- Overview & Importance of this Topic
- PII - Tools and Techniques
- PII - National Standards & Current Trends
- Practical Considerations for Implementation
- Resources & Additional Training

Why the Growth of PII ?

- **AASHTO reqmt –** recent FHWA memo
- **OWNER** verification of design compliance
- **Contractor/Installer** - Improved installation quality
- **Producer/Supplier –** Proper product handling and installation
- **System User –** Minimized safety risk
- **Tax-Payers -** Minimizes lifetime project and unanticipated costs!

PII - Tools and Techniques -

- PII Methods
- Advanced Tools
- Documentation of Conditions

Tools of the Trade

CCTV – Camera


02/08/12 12:04
377.2 FT.
MH START: 001
MH STOP: 002

XY Diameter Observations Report

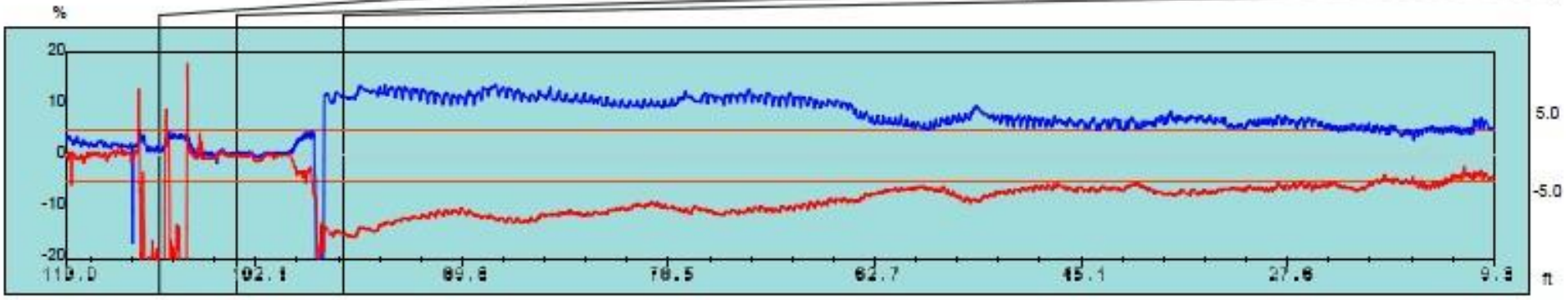
Pipe deflected approximately 14 to 15 percent

Site ID		Asset No. Wilshire Blvd	Date 2/11/2013
City	Oklahoma		Material HDPE
Start No	MH 1	Finish No Creek	Pipeline Length 123.4 ft
Location	Up Stream	Location Down Stream	Internal Diameter (Expected) 35.54 in

Camera tilted at joint causing spike in data.

Pipe round at 103.5 ft.

Pipe deflected approximately 14.6%.



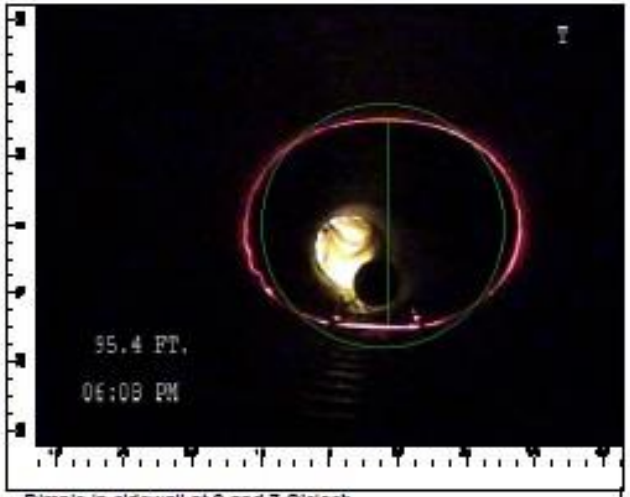
90% - Fractile: (X) 11.7% : (Y) -0.4%, Exceeded limits: 87.6%

XY Diameter Observations Report

Pipe deflected approximately 14 to 15 percent

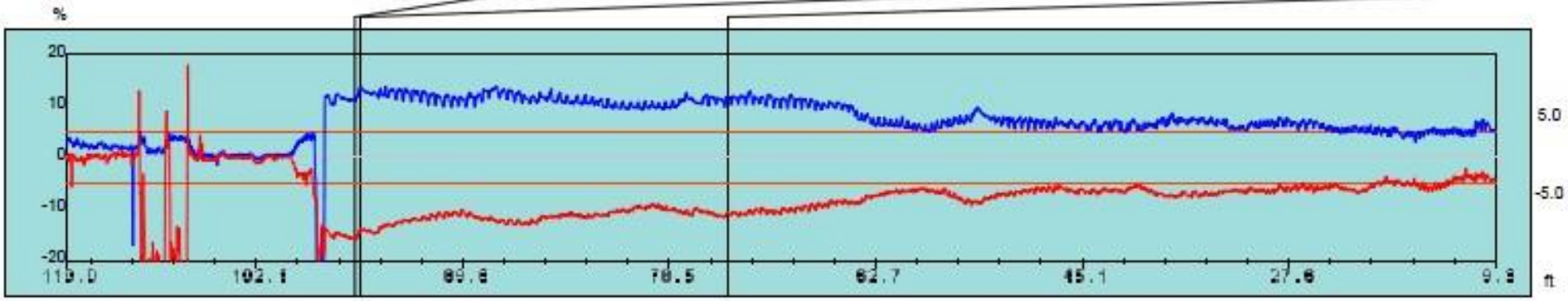
Site ID		Asset No.	Wilshire Blvd	Date	2/11/2013
City	Oklahoma			Material	HDPE
Start No	MH 1	Finish No	Creek	Pipeline Length	123.4 ft
Location	Up Stream	Location	Down Stream	Internal Diameter (Expected)	35.54 in

Pipe deflected and changes grade.



Dimple in sidewall at 2 and 7 O'clock.

Severe dimples in sidewalls



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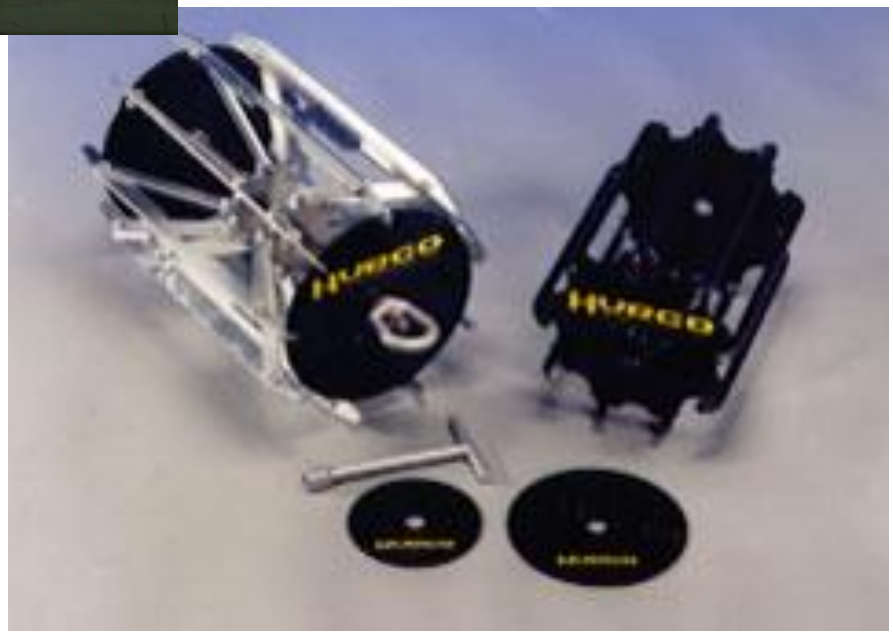
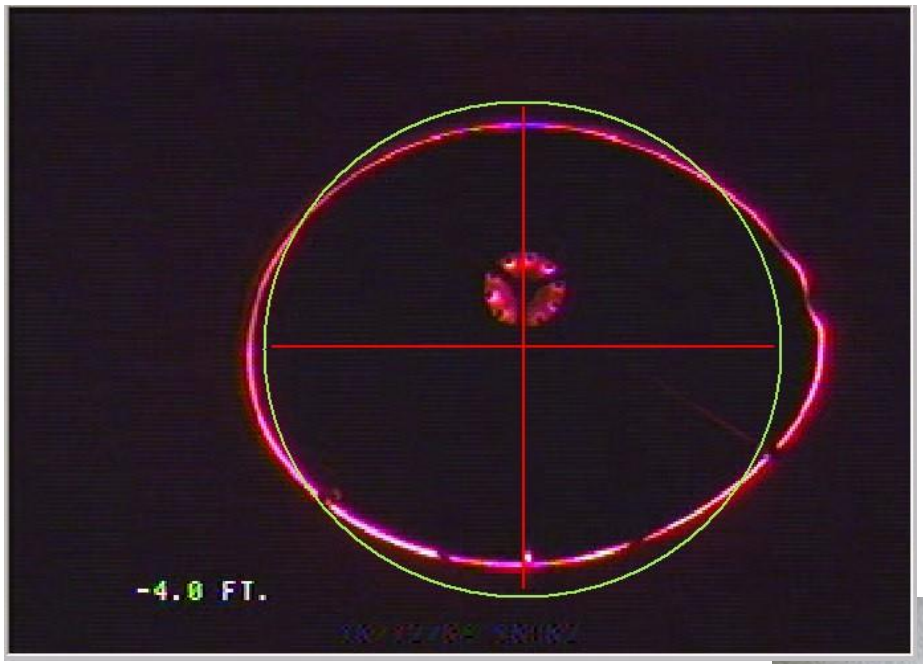
Tools of the Trade: Deformation/Deflection



Tools of the Trade: Deformation/Deflection



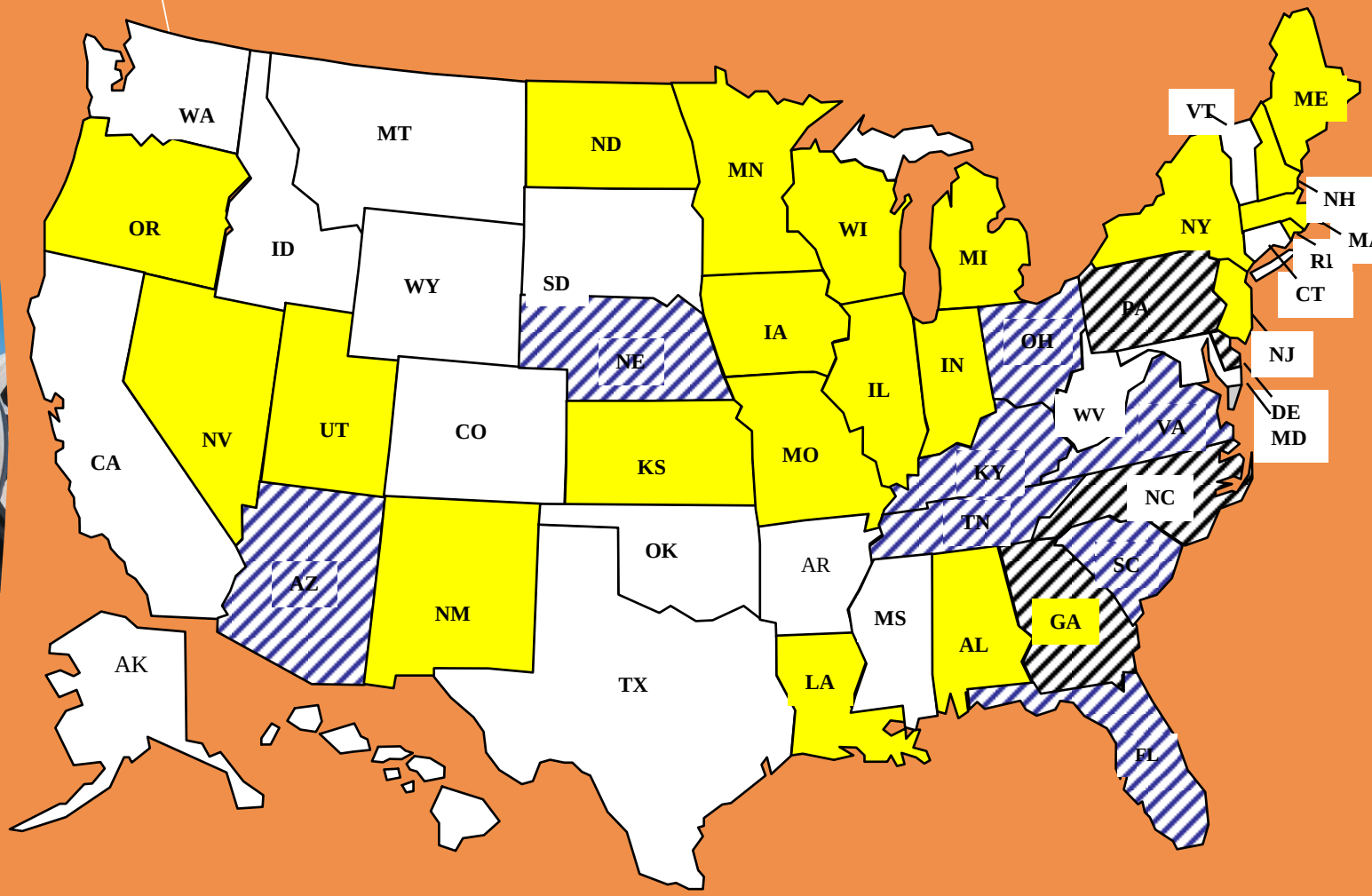

rausch
ELECTRONICS USA


STA.123+45 SBSH 001.9'

Tools of the Trade: Measurement

Video Micrometer

State DOT PII Policies



Read More About it – ACPA ePipe – PII

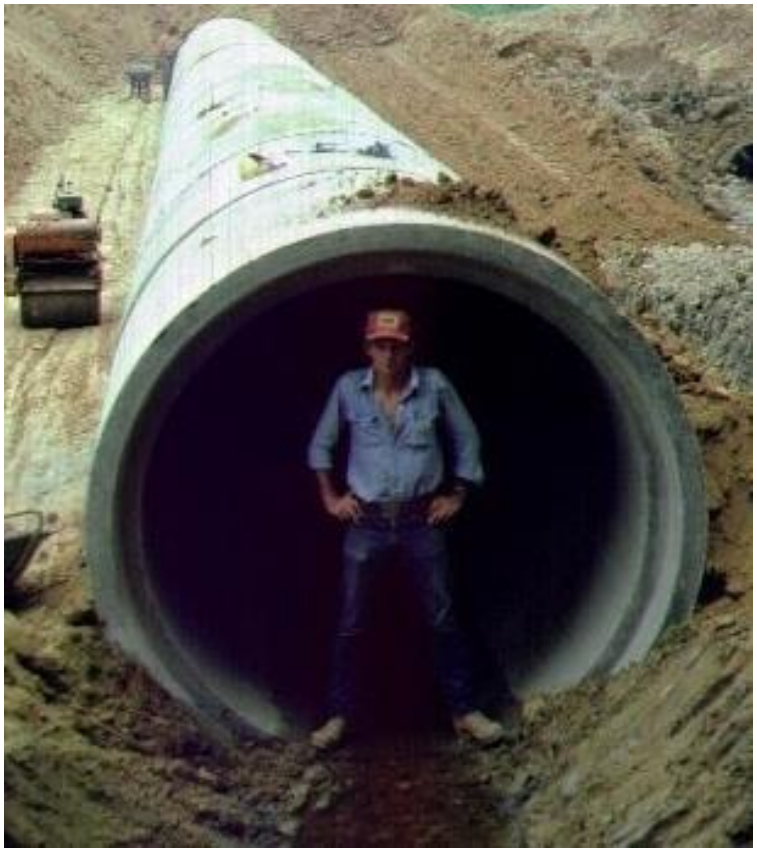
Post Installation Inspection – National Standards

AASHTO – “LRFD Bridge Construction Specifications”

- CMP – Section 26.5.7
- RCP – Section 27.6.1
- THERMOPLASTICS – Section 30.5.6

Concrete Pipe Culvert - PII Items in AASHTO…

- Misalignment
- Joints
- Cracks
- Spalls
- Slabbing



AASHTO SECTION 27.6.1- RCP

Cracks

AASHTO SECTION 27.6.1- RCP

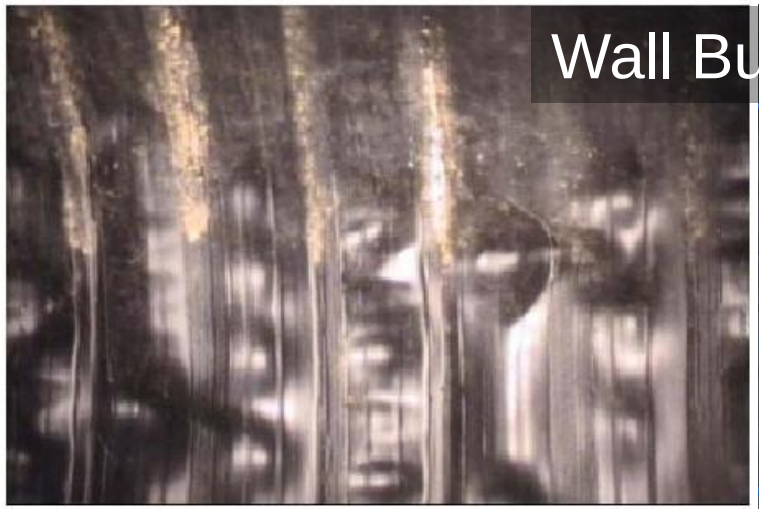
Highlights :

- No inspection until 30 days after all backfill placed/completed
- General acceptability of cracks up to 0.10” in non-corrosive environment (soil/water Ph > 5.5)
- Crack pattern, location, size (length & width), all important considerations in determining any required remediation

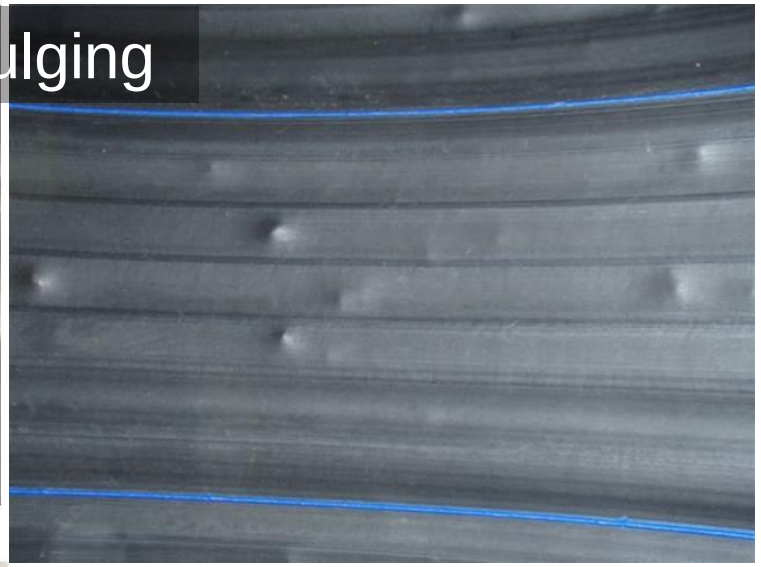
radial tension failure – “slabbing” – typically caused by point loading

AASHTO -Thermoplastic Pipes / Culverts (PP, PE, PVC)

- Misalignment
- Joints
- Cracks
- Buckling, Bulging, Racking
- Deflection



Wall Bulging



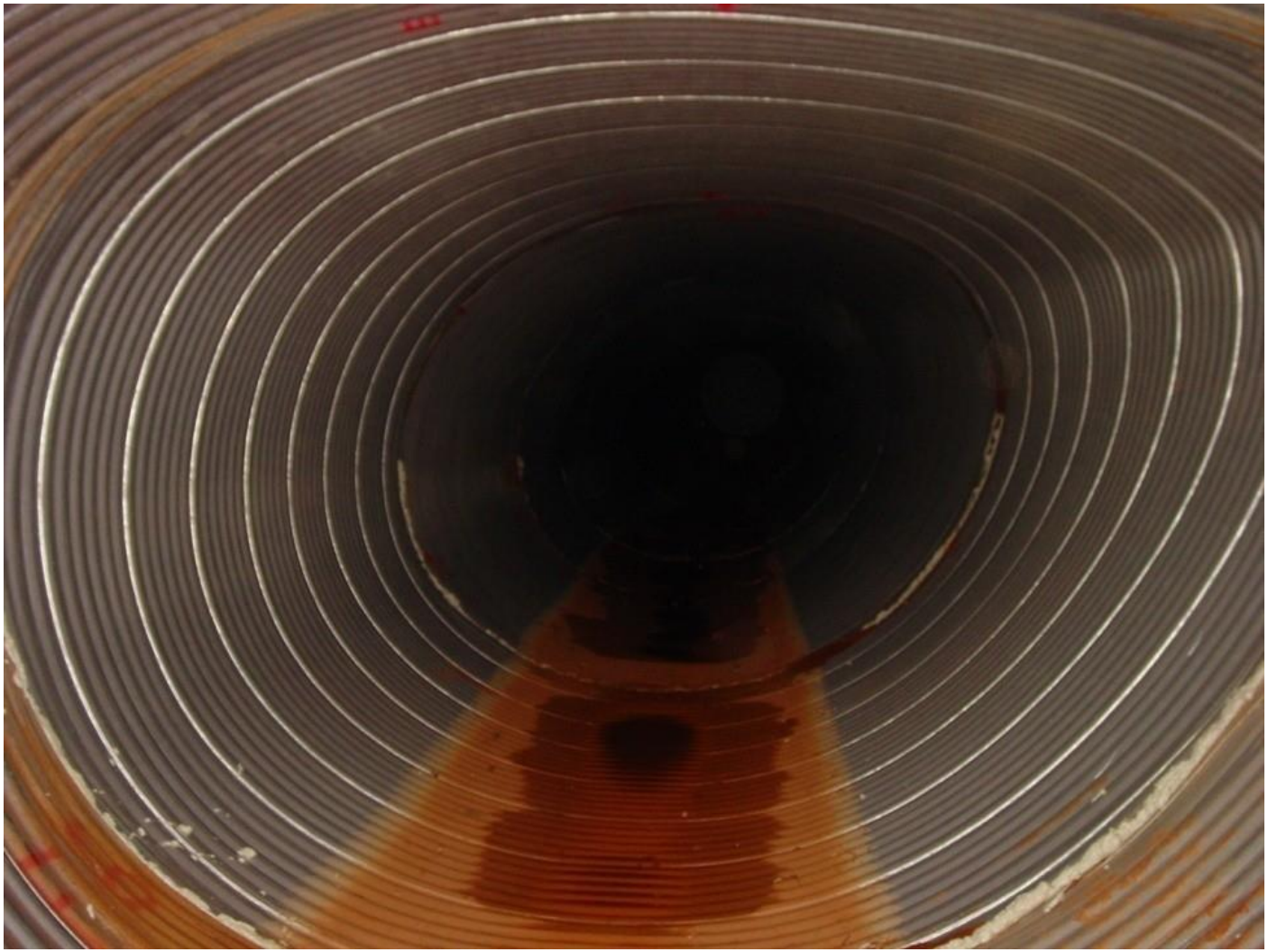
Wall Crushing/Cracks

Deflection/deformation

DEFLECTION – AASHTO SECTION 30.5.6

Thermoplastic PIPE

DEFLECTION –
AASHTO SECTION 26.5.7 - CMP



AASHTO Summary

- Some Inspection Items Same for all pipe
  - PII after Fill & 30 Days
  - PII includes misalignment, cracks, joints
- PII Issue Differences:
  - Thermoplastic Pipe: + buckling, bulging, racking, deformation
  - CMP: + deformation

AASHTO Requires Measurement

Conditions Requiring Measurement

- Crack Width and Location
- Joint Gap
- Deflection/Deformation

Practical Considerations for PII Spec Development

- Specification clarity
- Evaluation criteria
- Inspection & evaluation team preparation
- Installer education
- Communication of processes to all stakeholders

PII Specifications and Evaluation Guidelines

- Techniques, Tools, Certifications
- Evaluation Guidelines

Tools for Non-Human Entry Post Installation Inspections

	RCP	HDPE	CMP
Visual/Video Inspection	✓	✓	✓
Mandrel Testing		✓	✓
Laser Deflectometer		✓	✓
Video Micrometer	✓	✓	✓

Inspection Team Preparation

PACP - Pipeline Assessment and Certification Program

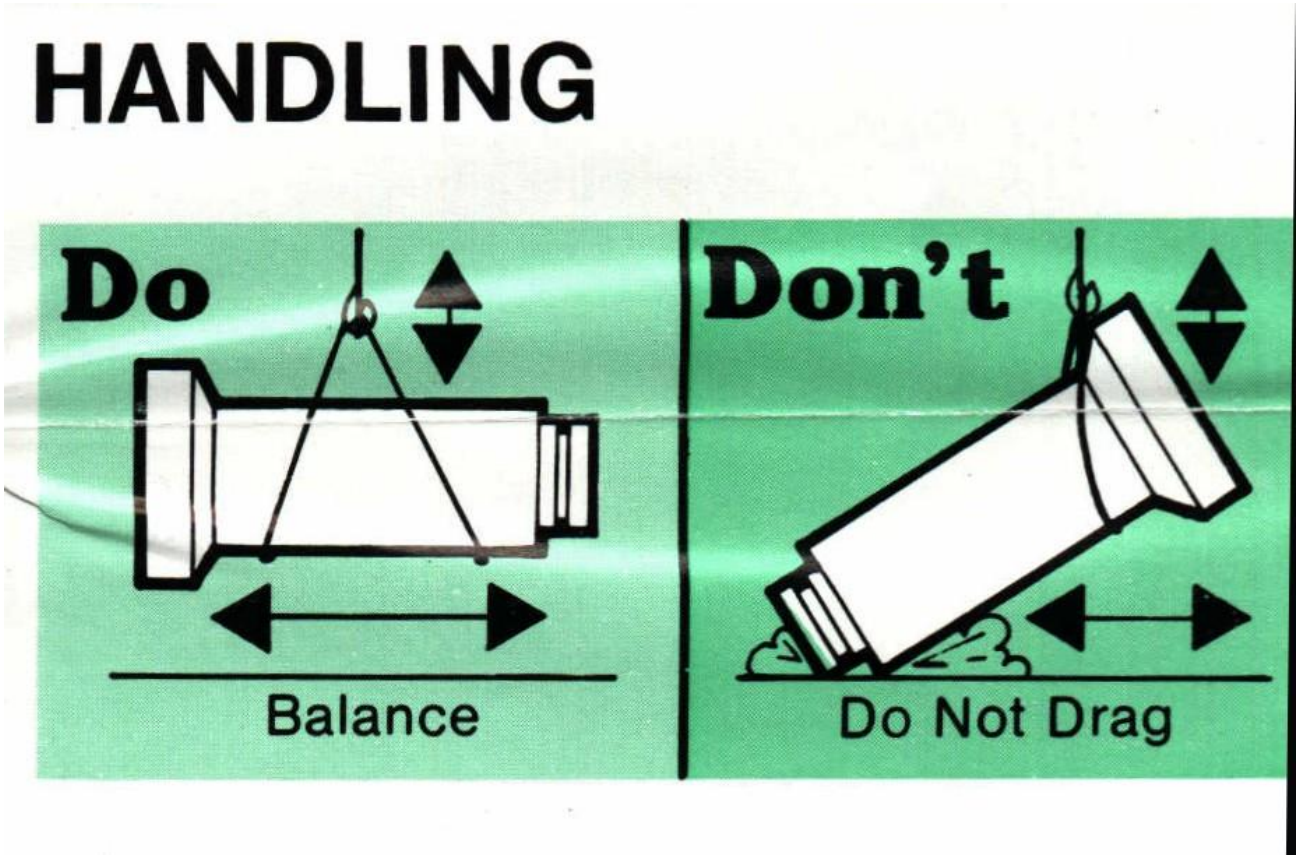
- Standard reporting (CODES)
  - **Structural Defects/Condition**
  - Operation & Maintenance Conditions
  - Construction Features
  - Misc. Features
  - Condition Rating of Pipeline
- **10,000 Certified**
- Municipalities require it
- Data Collection/Reporting **Software**
- http://www.nassco.org/training_edu/pdfs/pacp-macp_overview.pdf

PACP Reports vs. AASHTO PII Acceptance Criteria

- Visual Vs Measurement
- Cracks
- Storm vs Sanitary Issues
- Resolving Differences

Installation Training

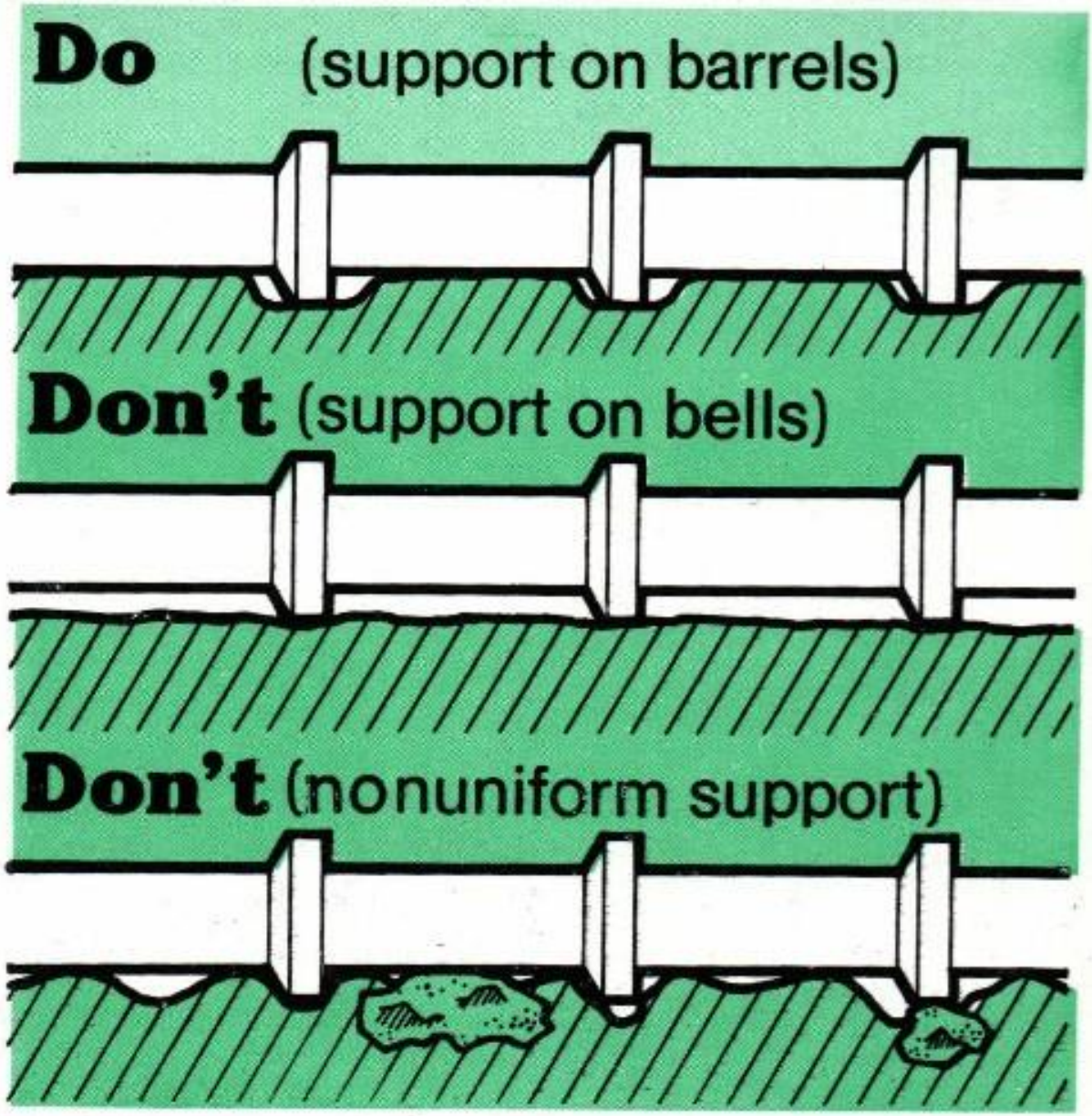
- Handling & Installation Techniques
  - 99% of issues



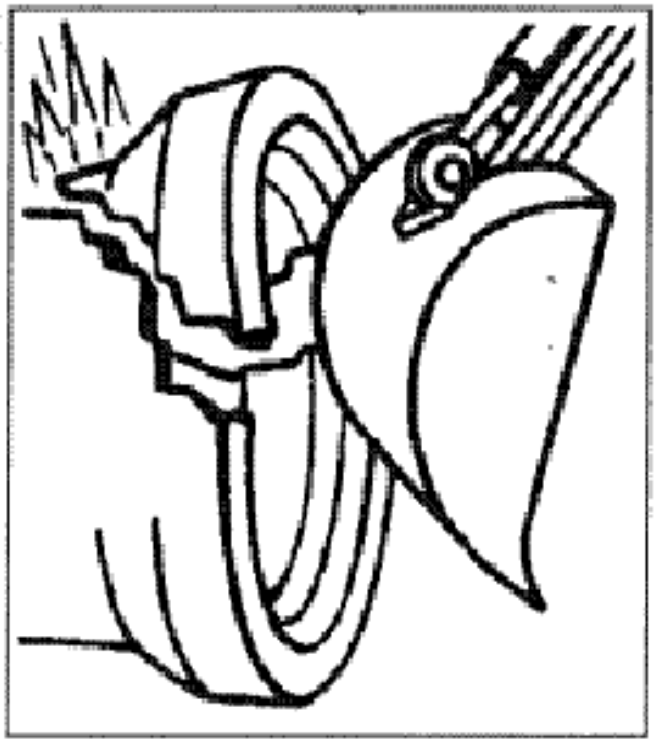

May be source of leakage

Stable Foundation - **Critical**

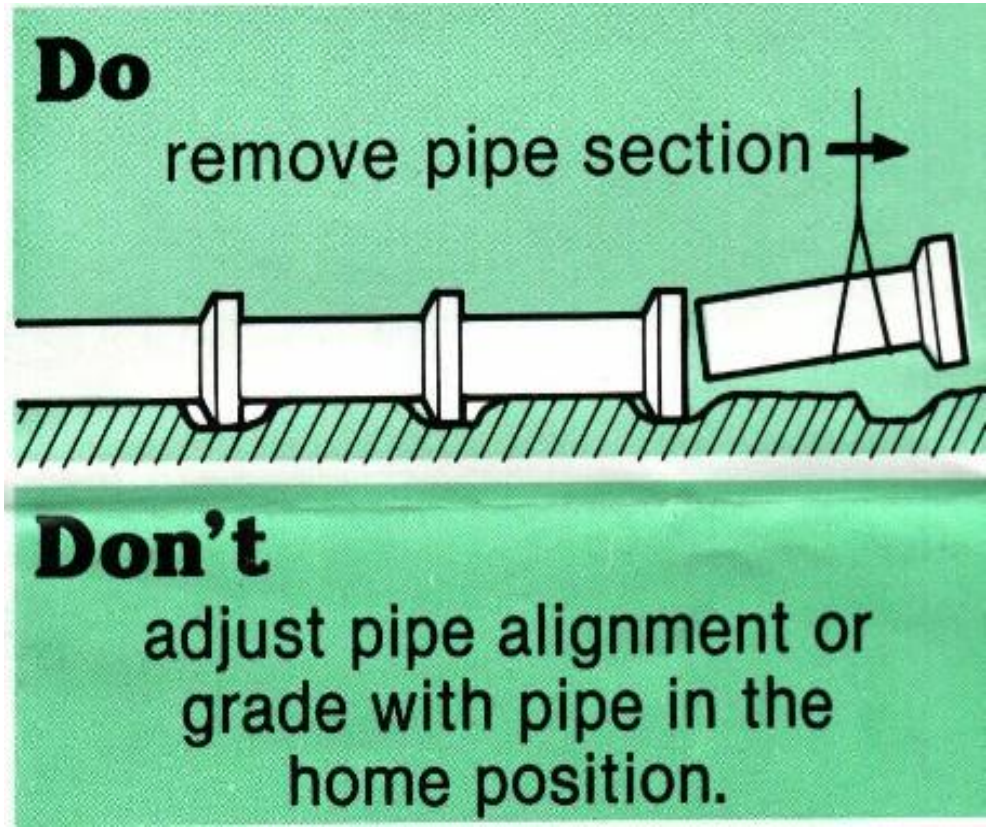
Bedding Inspection



Line & Grade



Incorrect




CONSTRUCTION LOADS!

Evaluation Team

- Thorough training
- Differentiate
  - Cosmetic = Non-ISSUES
  - Minor Damage = Note but No Repair
  - Structural Issue = Evaluate Severity and remedy required

ACPA– Implementation Resources

- PII ePipe - Overview & Summary of State Specifications
- PII Model Specifications
- PII Pipe Evaluation and Repair Guidelines

PII Inspection Tool #1

ePipe **Video and Laser Measurement Tools**

New Storm Pipe Installation Quality Assurance at Its Best

American Concrete Pipe Association

www.concrete-pipe.org

An educational document from the American Concrete Pipe Association for users and specifiers

Over the past decade, the deteriorating state of our nation's infrastructure has gained increased attention. Great emphasis has been placed on the aging bridges of our nation's roadways due to several high profile catastrophic failures. Sadly, it took the death of several motorists to spur a public outcry to address the current state of despair of one our nation's most important infrastructure components.

Our roadway pipe systems demand this very same attention, since they are the "unseen" bridges of our nation's ground transportation systems. While we must address the existing aging system, to maximize the life of future installations we must act now to ensure quality installations are occurring.

It is apparent that we must fully address the importance of:

- Proper **INSPECTION** of all installations,
- Adequate design life,
- Conservative design approaches,
- Complete and stringent reviews of all critical construction components,
- Strong quality assurance programs throughout the construction process, and
- Diligent and proper maintenance of all the components of our roadway infrastructure.

Post Installation Inspection Resources

Guidelines for PII (model specs)

- “Post Installation Inspection Basics”
- “Post Installation Inspection Methods, Tools, and Reports”

Evaluation and Repair Tools

- “Post Installation Evaluation and Repair Guidelines of Installed RCP”
- “Evaluation & Repair Guidelines for New Drainage Pipe”
- “Sample Specifications for Evaluation of Newly Installed Culvert and Storm Drain Pipe”

Post Installation Inspection Demo. & Plant Tour's are Available

More Detailed Evaluation Training Available….

Think of any Questions or Concerns?