

# Aging Water Infrastructure Research Program SAB Consultation Rehabilitation of Wastewater Collection and Water Distribution Systems

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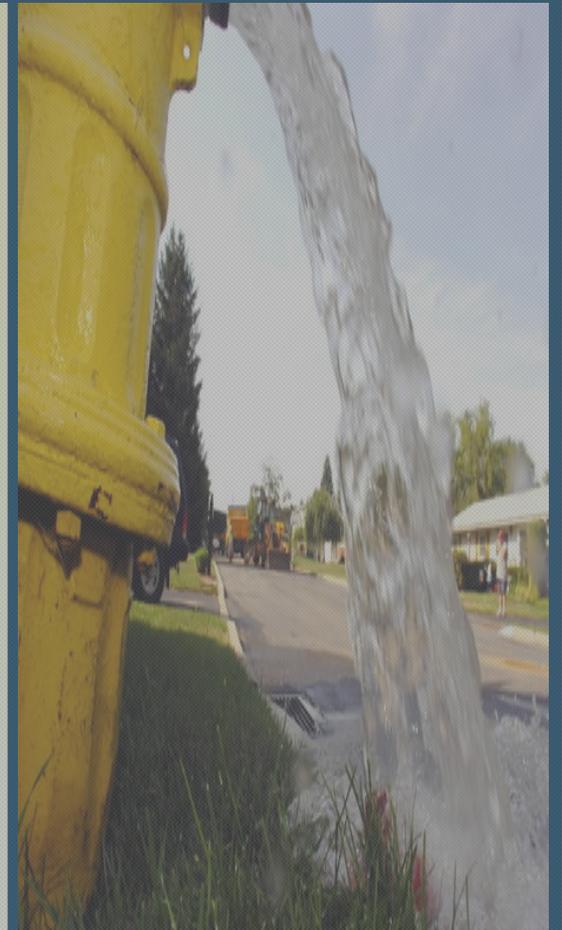
# Rehabilitation

## Definition:

Rehabilitation includes repair, renewal, and replacement of pipes and components (pump stations, manholes, etc.) to return the system to near-original condition and performance.

## Research Area Goals:

- To accelerate the application of innovative technologies for cost-effective rehabilitation/replacement of aging/failing drinking water distribution and wastewater collection systems.
- To conduct full-scale demonstrations of promising technologies that will gather reliable cost and performance data.



## Project Strategies

- Identify, characterize, and document the SOT at the global level, including critical data and capability gaps, for the rehabilitation of DW and WW conveyance systems.
- Demonstrate and evaluate promising innovative technologies and decision-support systems under controlled-conditions and at sites of opportunity.



## Tasks

- Establish Stakeholder Group
- Conduct Technology Forum
- Develop State-of-the-Technology Reports
- Develop Protocols/Metrics for Demonstrations
- Develop Site Selection Criteria for Demonstrations
- Field Demonstration of at Least Two Technologies
- Develop Rehabilitation vs. Replacement Decision Support Strategies

## Stakeholder Members

- **Steve Allbee** - EPA Office of Water
- **Dr. Daniel Woltering** - WERF
- **Dr. Jian Zhang** - WRF
- **John Hemphill** - NASTT
- **Duncan Rose** - GHD Consulting, Inc.
- **Dr. David Hughes** - American Water
- **John Griffin, Jr.** - City of Atlanta

## Research Partners

- **Battelle Memorial Institute**,  
Columbus, OH
- **Trenchless Technology Center**,  
**Louisiana Tech.** (Dr. Ray Sterling)
- **Jason Consultants**
- **Virginia Tech University** (Dr. Sunil Sinha)

## International Forum

**Purpose:** Develop inventory of rehabilitation technologies and identify candidate technologies for demonstration.

### Forum Highlights

- Need decision-support systems:
  - Rehabilitation methods/materials
  - Rehabilitation vs. replacement
- Lack of understanding of rehabilitation capabilities; need rational/uniform design approach
- Proprietary systems, procedures, materials
- Need long-term performance/cost data
- Better technologies for water distribution pipes
- EPA clearing house for performance/cost data
- **Retrospective evaluation of rehabilitation technologies**



- 31 Invited Experts
- 21 Presentations
- Group Discussions
- Vendor & Utility Roundtable Discussion

## Retrospective Evaluation of Lining Technologies

- Develop protocols for the forensic evaluation of existing rehabilitation systems.
- Demonstrate protocols on selected case studies.
- Encourage municipalities to examine their rehabilitated systems using the protocols.
- Develop/provide database on performance.

## Next Steps

### 1. Selection of Technologies for Demonstration

- *Wastewater*: CIPP with UV-cured (Glass fiber & polyester tube impregnated with polyester or vinylester resin & UV cured)
- *Water*: CIPP with hot water or steam cured (Aqualiner, Aquapipe, InSitu Main)

### 2. Selection of Potential Demonstration Sites

- Columbus, OH
- Indianapolis, IN
- Omaha, NE

### 3. Preparation for Demonstration

- QAPP
- Protocols/Metrics
- Site Selection Criteria

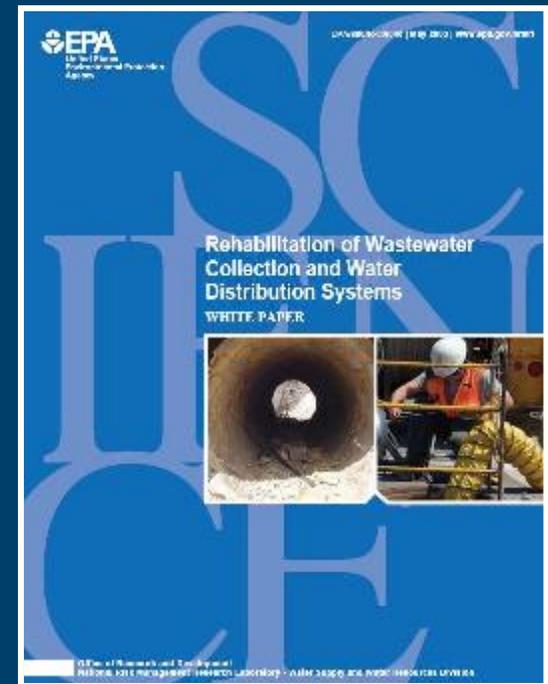


### 4. Demonstration Trials

## Planned Outputs

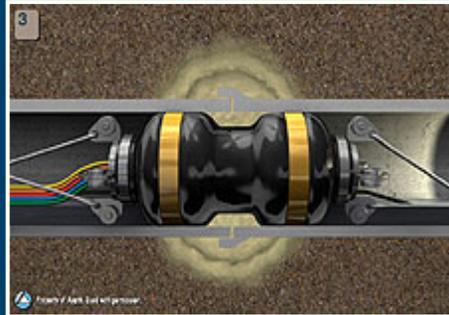
- State of the technology reports on rehabilitation of:
  - Wastewater collection pipes & service laterals
  - Force Mains
  - Water distribution pipes & service lines
- Report on initial field demonstrations
- Rehabilitation vs. replacement decision approach
- Report on retrospective evaluation of lining
- Journal articles

### State of Technology Report



EPA/600/X-09/048

## ETV Program



- Established Infrastructure Stakeholders Group.
- Evaluating coatings & grouting materials for rehabilitating stormwater & wastewater infrastructure.
- Six vendors participating at University of Houston's Center for Innovative Grouting Materials and Technology.
- Verification Reports in 2010 & 2011.

## Stakeholder Members

- NSF International
- NASSCO
- WRF
- University of Houston
- Springfield Water/Sewer Comm
- Inland Water Pollution Control
- Black & Veatch, Hydroqual
- Ultraliner
- Virginia Public Works Equip.
- Prime Resins
- Cues, Inc.

## Summary

- Water & sewer systems are critical to the effective functioning & environmental health of our cities.
- Delay in addressing the problems only increases total costs.
- Rehabilitation technologies are available & continue to be developed.
- International technology transfer, design, & performance data can improve the cost-effectiveness of rehabilitation efforts.
- This can translate into billions of dollars saved.

# Thank You!

## Questions/Comments?

