

Development of a Rehabilitation Technology and System for Water Pipe Maintenance Operations

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CURRENT WATER UTILITY PRACTICE:

A Water Utility's financial plans include two budget categories:

- 1) Operations Budget: includes the annual plans and expenses for maintaining utility assets.
- 2) Capital Works Budget: includes annual or multi-year financial plans for the improvement of utility assets.

The Operations (O&M) Budget is often 80% of total budget.

While Operations and Maintenance (O&M) budgets fund the upkeep repair of our buried drinking water assets....



...our water pipes are now reaching the end of their useable lives.



Cities throughout North America have 100s of kilometers of aging, congested and leaking pipes.

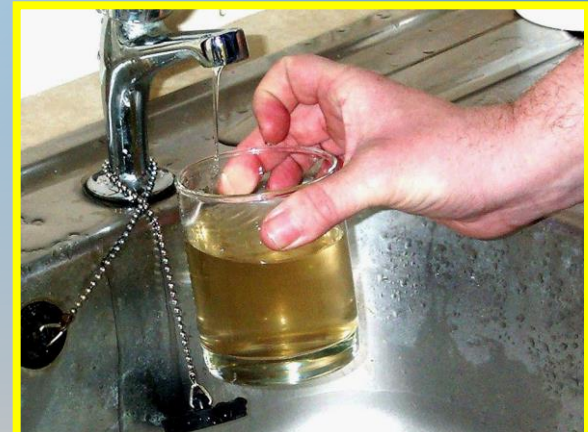


We are moving from a maintenance and repair stage to a rehabilitation stage in the life cycle of our drinking water assets.



What are the indicators we are moving beyond O&M budgets?

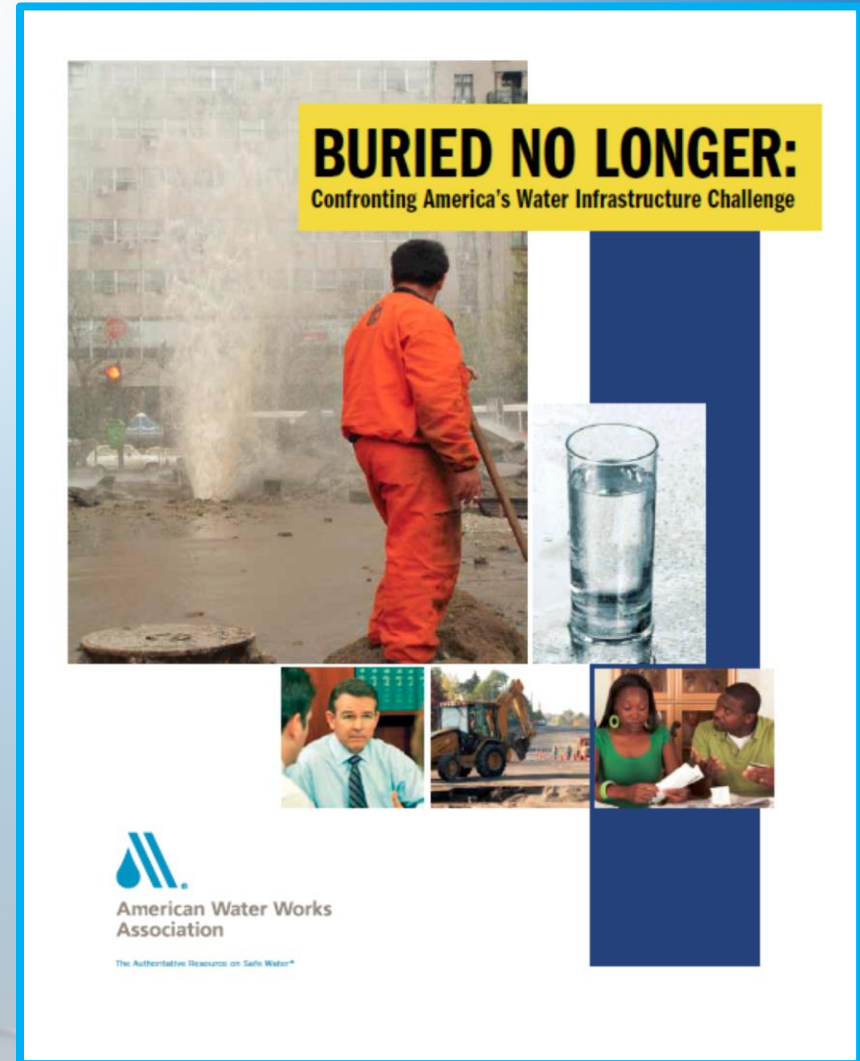
- Service outages are more frequent.
- Increasing damage to infrastructure.
- More poor water-quality incidents.
- Noticeable reduction in fire flows.
- Increased energy costs for water supply.



Rehabilitation programs shift the funding focus of Utilities from Operations Budgets to Capital Budgets.



According to AWWA, the funding gap is \$1.0 trillion (U.S.) over the next 35 years.



The reaction amongst many public utilities has been to squeeze O&M budgets and delay multi-year capital programs.



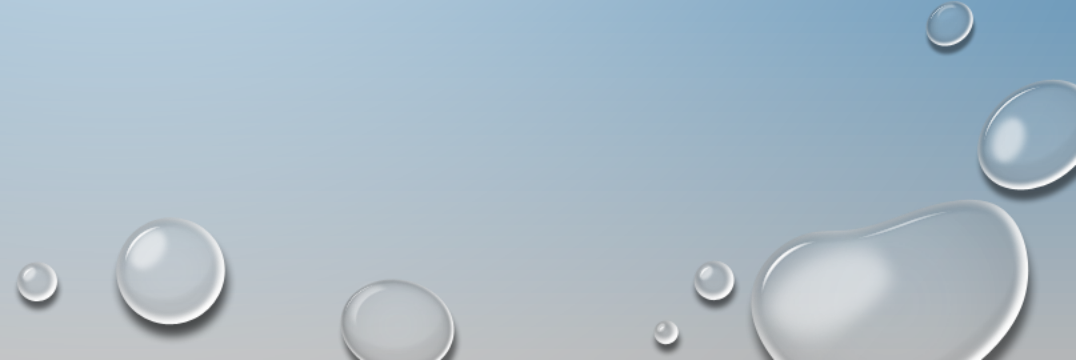
Is it possible to leverage innovative technologies to extend the lives of buried pipes under O&M budgets....



.... thereby avoiding capital programs?



Utility operations budgets (O&M) include:

- cleaning and flushing mains;
 - fixing water main breaks; and,
 - scheduled repairs and replacements.
- 

O&M budgets focus on short-term maintenance functions: e.g. pipe operational cleaning



Unidirectional flushing



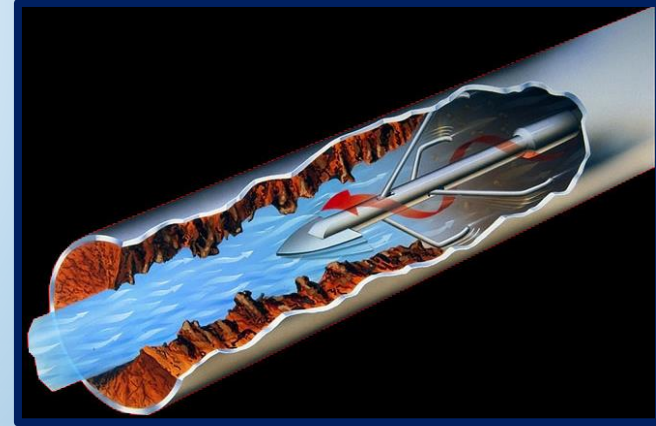
The background is a solid blue color with a gradient, lighter in the center. It is decorated with several realistic-looking water droplets of various sizes, some with highlights and shadows, giving them a 3D effect. They are scattered across the top, bottom, and right sides of the slide.

Capital budgeting requires:

- capital planning and priorities for improvement,
- condition assessment of assets,
- development of multi-year capital program,
- development of contract documents & specifications,
- tendering and award of contract,
- construction phase & contract management; and,
- commissioning capital improvements.

Capital system improvements require:

- Access to the pipe.
- Temporary water supply.
- Full removal of corrosion products.
- Inspection and assessment.
- Installation of a liner for life extension/improvement.
- Final inspection.
- Disinfection and return to service.



These improvement services take time.

TEMPORARY WATER SUPPLY

- COSTLY AND NO ONE'S FRIEND: PUBLIC, CONTRACTOR OR OWNER.
- DIFFICULTIES IN COMMISSIONING CAN DELAY CAPITAL PROJECTS!



WHAT HAPPENS IF YOU CAN:

1. pre-screen pipe condition without shutdown;
2. eliminate the temporary water supply;
3. quickly and fully remove encrustation/sediment;
4. apply a rapid-setting polymeric lining;
5. complete a speedy pipe disinfection; and,
6. put the pipe back into service the same day?

WOULD THIS ALLOW YOU TO:

- avoid years of delays: paralysis by analysis;
- avoid years and years of expensive condition assessment studies;
- avoid the expensive strategy of asset replacement; and,
- build better programs to fix the right pipe at the right time, using the right method?

YES IT WOULD!



- Can we bring innovative technologies to bear to make this happen?

IS IT TECHNICALLY POSSIBLE:

1. TO ELIMINATE TEMPORARY WATER SUPPLY REQUIREMENTS.

YES IT IS.

2. TO ECONOMICALLY PRE-SCREEN PIPE CONDITION WITHOUT SHUTDOWN.

YES IT IS.

3. TO QUICKLY REMOVE ALL ENCRUSTATION/SEDIMENT.

YES IT IS.

4. TO APPLY A BONDED, NSF 61 POLYMERIC LINING.

YES IT IS.

5. TO PUT THE PIPE BACK INTO SERVICE IN THE SAME DAY.

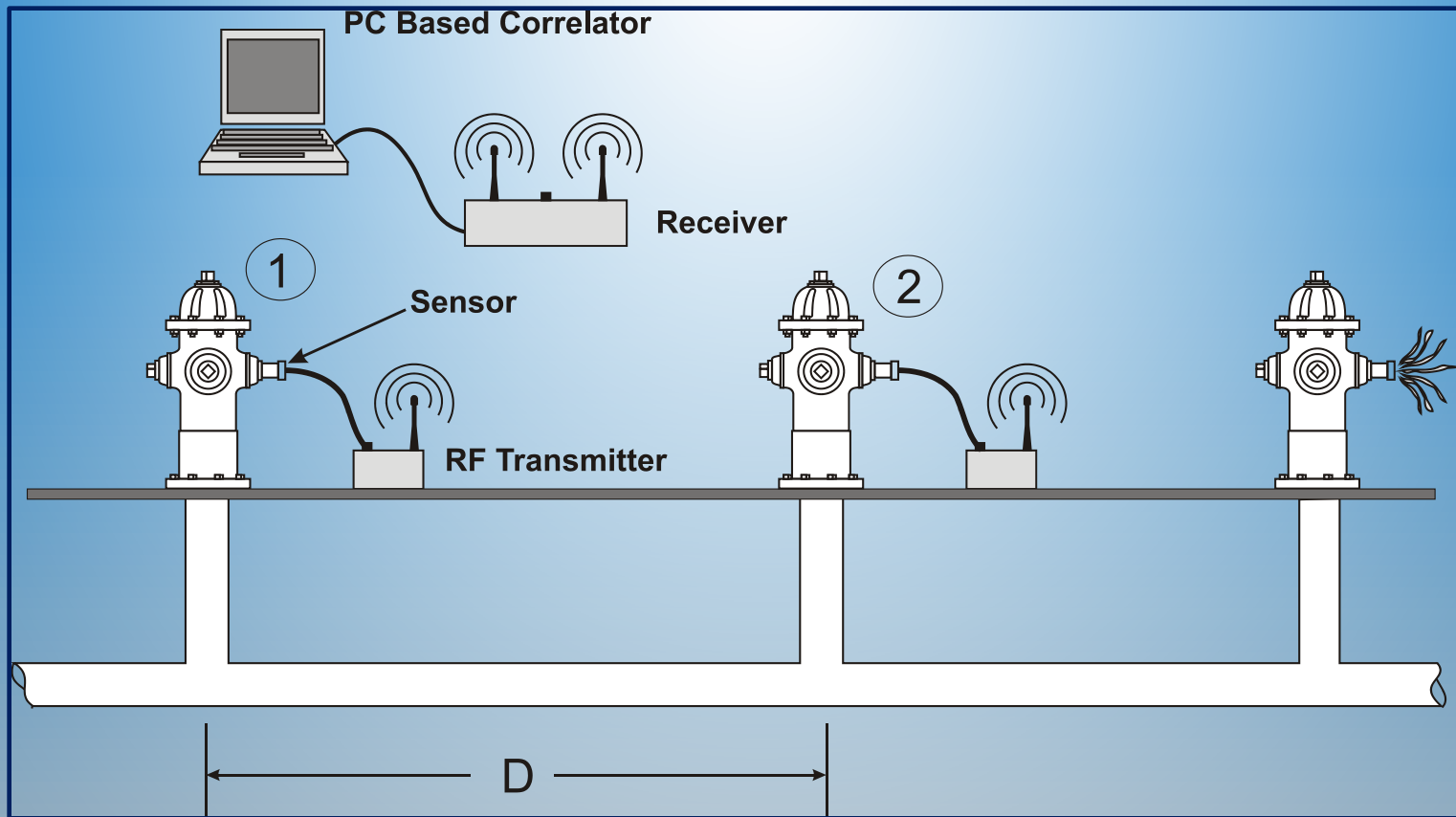
YES IT IS.

Start with historical record review
and non-destructive, survey-level
leak/condition technology



PC-BASED LEAK NOISE CORRELATOR

The majority of pipe failures begin with leaks!



Leak and wall thickness survey locates system problems

Prioritize pipes and make surgical excavations to access pipes



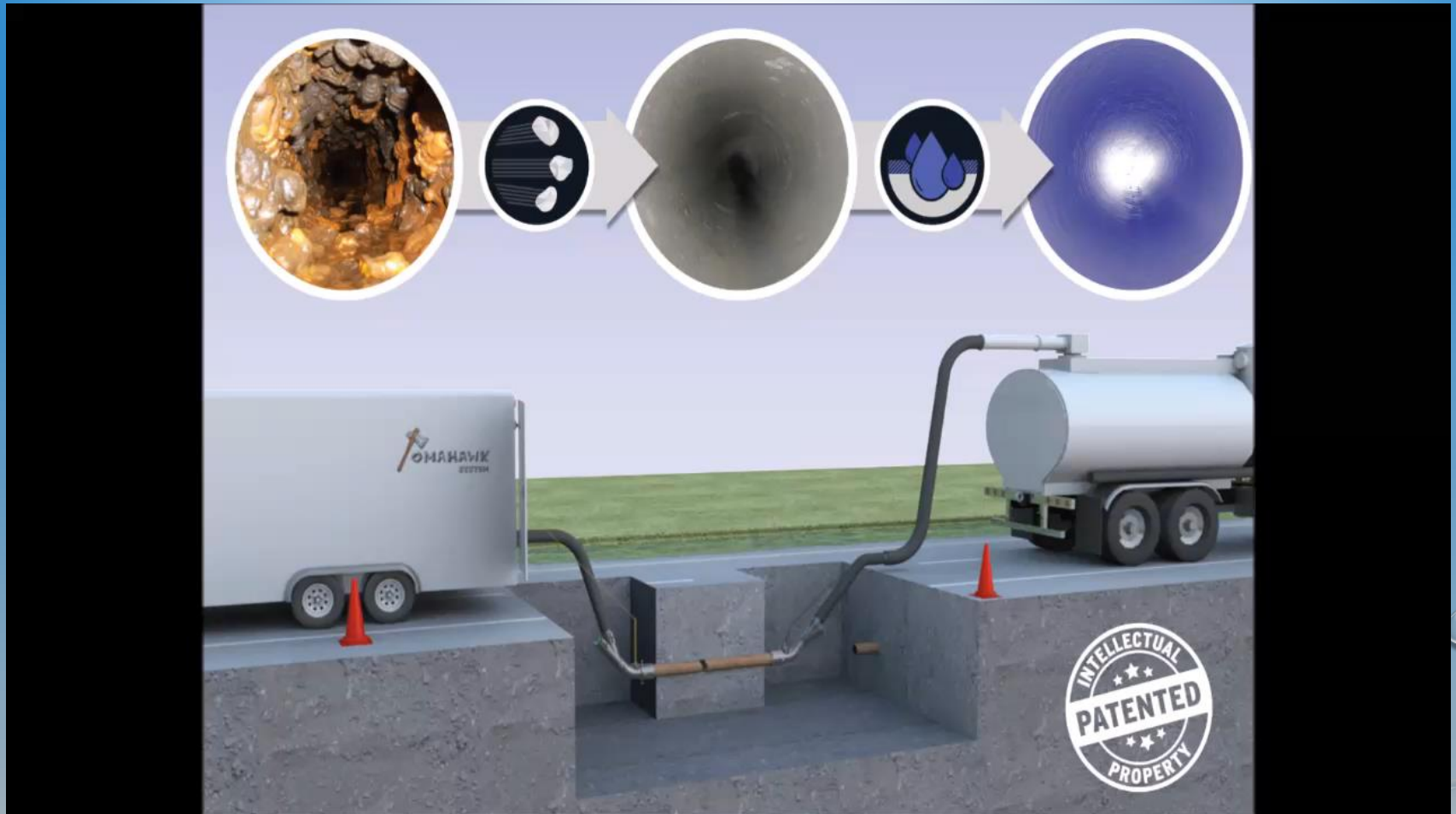
Rapidly and effectively clean,
prepare, dry and inspect the old pipe



The outcome yields immediate results:



Immediately apply a NSF 61 polymeric barrier lining



Or, rapidly increase the lining thickness for higher-build performance.



Immediately inspect the polymeric liner



Return pipe to service with potable water precautions...



Now, let's compare costs:



Spray-in-place pipe (SIPP)
\$120 – \$300/meter lining



Cured-in-place pipe (CIPP)
\$400 - \$700/meter lining

50% savings!

Advantages of combining cleaning, inspection & rehab:

- offers “fast-start” O&M program for improved water quality and “C” factor;
- includes an economic, non-destructive survey of pipe condition;
- stretches O&M dollar and allows utilities the option to self-perform the work;
- offers utilities the most cost-competitive program; and,
- builds more effective (and smaller) capital programs.

WOULD THIS ALLOW YOU TO:

- avoid years of delays: paralysis by analysis;
- avoid years and years of expensive assessment and analysis programs;
- avoid the expensive strategy of using AWWA Class IV replacement liners everywhere; and
- build a better and more cost effective program to

**FIX THE RIGHT PIPES AT THE RIGHT
TIME, WITH THE RIGHT METHOD?**

YES IT WOULD!



Questions?



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