Making Your Buried Assets Last: Optimization of Buried Infrastructure – Louisville Water Company's Experience

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Louisville Water Company

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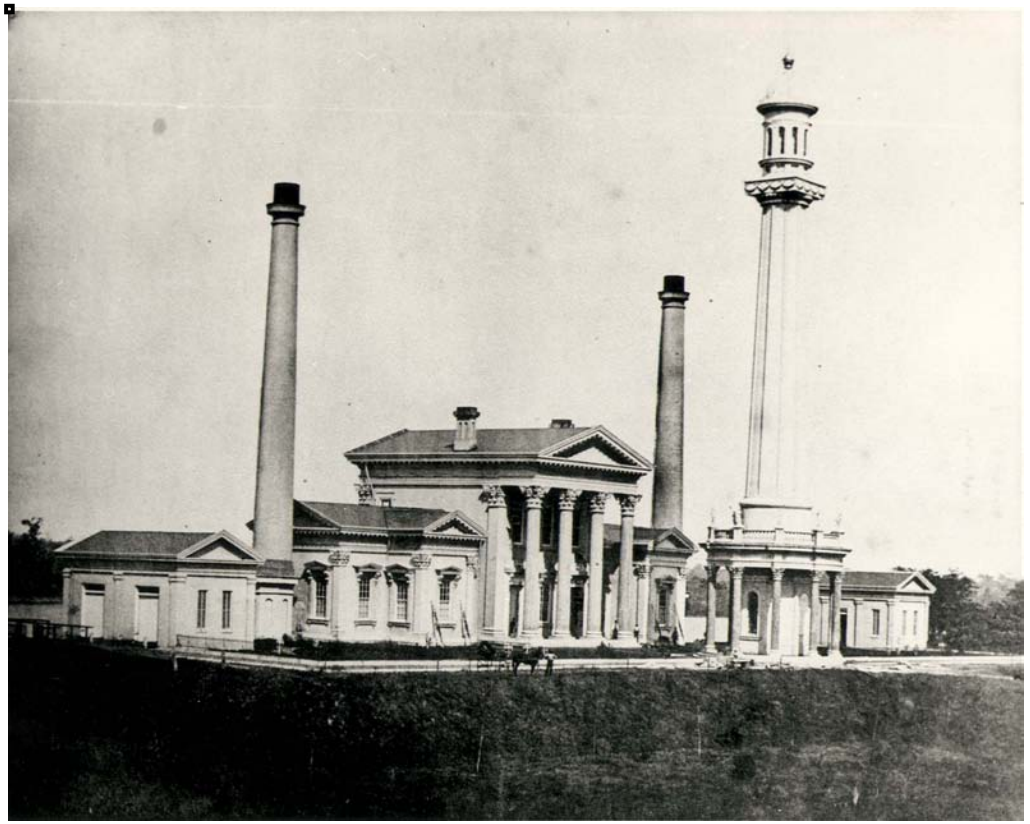
Louisville Water Company – Overview

- Began in 1860 as Kentucky's first public water provider
- Original Water Works included 26 miles of main and 512 customers



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Louisville Water Company - Overview

- Over 306,000 customer accounts
- Serving nearly one million people in Louisville and surrounding communities
- 2013 Average Daily Delivery of 116 million gallons

Today's Distribution System

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- Over 4,100 miles of water main (some dating back to 1860)
- 200 miles, roughly 5% of transmission main larger than 20-inches in diameter.
- 589 water main breaks in 2013

History of Replace and Repair

- In the 1980s, Louisville Water began a defined program to address troublesome infrastructure
- Main Replacement and Rehabilitation Program (MRRP) focuses on 12” and smaller mains
- To date, over $160 million investment
- Program is considered a model and #breaks per 100 miles per year is on a downward trend
- All cast iron main was lined or replaced over a 15-year period

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Today Repair & Replace Continues + Condition Assessment

- The Main Replacement Program is being incrementally increased
- $12.5M budget request for 2016
- Goal is to replace 0.5% of main per year; estimated to cost $20M per year by 2020
- Since 2007, the MRRP is a performance-based program
- And in 2009, we added a robust transmission condition assessment program

The Beginning of LWC's Condition Assessment Program

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Failure of the 60-Inch PCCP Transmission Main between BE Payne Plant and English Station Road Tank 05/13/09

Evolution of Condition Assessment

May 13, 2009 may have been a day of disaster, but also marked the start of the Condition Assessment Program at LWC.

Since 2009, LWC has inspected **13,350** sections of pipe, identified **194** distressed sections of pipe, and replaced or rehabilitated **86** sections of pipe.

In addition to replacement, LWC has also piloted several rehabilitation methods. . .

The use of steel bands,

external post tension,

and carbon fiber wrap.

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July, 2011 – a 48” main breaks and sends 70 million gallons rushing onto the University of Louisville campus.

Innovation

Subsequent breaks created the opportunity for the first large-scale inspection of a transmission main while it was filled and in service.

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LWC's Transmission System

Miles of Transmission Main by Type and Size

Diameter	PCCP	Ferrous	Concrete	Other	Total
20"	0.00	24.21	0.00	0.07	24.28
24"	41.46	17.46	0.56	0.09	59.57
30"	26.34	10.55	3.60	0.41	40.90
36"	5.96	10.77	0.92	0.09	17.74
48"	11.30	12.51	4.25	0.72	28.78
60"	26.08	0.03	10.42	0.08	36.61
>72"	0.00	0.05	0.15	0.48	0.68
Miles	111.14	75.58	19.90	1.94	208.56
%	53.3%	36.2%	9.5%	0.9%	100.0%

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Replacement is not an option

Replacement Cost for all PCCP			
Diameter	Miles	$/lf	Cost
20"	0.00	$ 500	$ 0
24"	41.46	$ 700	$ 153,236,160
30"	26.34	$ 800	$ 111,260,160
36"	5.96	$ 900	$ 28,321,920
48"	11.30	$ 1,200	$ 71,596,800
60"	26.08	$ 1,500	$ 206,553,600
>72"	0.00	$ 1,800	$ 0
Total	111.14	$ 926	$ 570,968,640

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Since 2009, LWC has spent $19,300,000 on the Condition Assessment Program to inspect almost 250,000 feet (47.2 miles) of PCCP.

Preparation	**$5,900,000**	**31%**
Providing access to the main, one-time cost		
Inspection	**$6,000,000**	**31%**
Inspection and post-inspection risk analysis		
Replace/Rehab	**$7,400,000**	**38%**
Replacement or rehabilitation of main and attachments		

Unit cost for all work items - $77.39/lf
A little over 8% of the cost of replacement.

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Since 2009, LWC has experienced breaks on PCCP in May 2009 and June 2015. The cost of these repairs, including claims that have resulted from property damage exceeded $2,542,000 ($1,271,000/ each break).

Since 2009, the Condition Assessment Program has identified 39 distressed sections of pipe that were likely to fail within the next 1-2 years. Another 15 distressed pipe sections were likely to fail within the next 5 years.

Pro-active replacement of these distressed sections likely saved almost $70,000,000 in repair and claim costs.

Louisville Water's Results

We don't just talk about water mains when they break

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