2010 Pipe Materials Guide

Taking a Look at the Pipe Materials Market

- Pipe Selection Guide
- 2010 Pipe Survey
- Pipe Fusion
- Case Histories

Trenchless TECHNOLOGY

A supplement to *Trenchless Technology*

What Lies Underground?

Trenchless Technology Polls Municipalities on Sewer Pipe Usage

By Sharon M. Bueno

What type of pipe is lying beneath our landscapes across North America today? Ask that question more than 100 years ago and the likely answers would be either brick or clay, with some wood thrown in for good measure. The pipe choice back then was as narrow as the method of installation.

In 2010, choice is the word… actually multiple choice. The possibilities open to municipalities when selecting pipe and its installation method are wide open. While the aging infrastructure still contains that brick, clay or even wooden pipe, today HDPE, PVC, ductile iron, fiberglass reinforced, steel, concrete, polymer concrete and vitrified clay are all available for any given project, which may involve horizontal directional drilling, pipe bursting, sliplining or pipe jacking to name a few.

With such a plethora of options, today's sewers hold an array of pipe materials. We wanted to get a glimpse into what cities are using as their vessel to transport their wastewater, as well as what trenchless methods they are using to install or rehab their existing pipe.

In 2004, *Trenchless Technology* conducted a survey of municipalities to gauge what their pipe selections were and what criteria was most important to them when making these decisions, which costs millions of dollars. We conducted the survey again in 2008 and have asked for more information in 2010. In all three endeavors, we surveyed sewer system operators and consulting engineers from North America. Below are the results of the 2010 non-scientific poll.

(Editor's Note: For some questions, respondents were allowed to check more than one answer, making some of the percentages exceed 100 percent.)

1. How many miles of sanitary sewer are in your system?

We wanted to see how large a system our respondents dealt with and we got a wide range of answers from 25 miles to 5,000 miles. Most respondents seem to fall into the 500- to 1,500-mile range.

2. Rate the importance of the following characteristics when choosing pipe material.

The longevity and design life was the most important factor in choosing pipe, with 90 percent of respondents indicating that this was "extremely important." The second most important criterion was meeting standards at 85 percent. These two areas swapped top spots in the 2008 poll and again in 2004. Price and ease of installation had the least amount of "extremely important" responses at 38 percent, although 58 percent and 56 percent of respondents, respectively, indicated that these were "important."

3. What type of pipe do you have in your system?

PVC: .....90 percent
Clay: .....86 percent
Concrete: .....69 percent
HDPE: .....57 percent
Iron: .....54 percent
Asbestos Cement: .....50 percent
Steel: .....27 percent
Brick: .....23 percent
Fiberglass: .....17 percent
Polymer Concrete: .....15 percent
Other: .....15 percent

At 90 percent, PVC was the most commonly used pipe material among respondents in the 2010 survey, with clay a strong second at 86 percent, with a fairly large gap between it and HDPE at 57 percent. In 2008, PVC and HDPE were the top two responses, respectively. In one response in the "Other" category, wood was noted.

4. How much of your system is composed of the various pipe types?

PVC: .....90 percent
Clay: .....88 percent
Concrete: .....70 percent
HDPE: .....57 percent
Iron: .....56 percent
Asbestos Cement: .....51 percent
Polymer Concrete: .....22 percent
Iron: .....56 percent
Steel: .....33 percent
Brick: .....26 percent
Fiberglass: .....22 percent

In this question, PVC was the top response at 90 percent with clay pipe right behind it at 88 percent.

5. How old is your system?

More than 100 years old: .....44 percent
75 to 100 years: .....62 percent
50 to 75 years: .....77 percent
25 to 50 years: .....93 percent
0 to 24 years: .....88 percent

6. Do you have requirements for design life?

Yes: .....56 percent
No: .....44 percent

7. If yes, what is the minimum design life required?

More than half of our respondents noted that they require at least a 50-year design life for the pipe they select for their project. In some instances, 30 years was the response, as was 100 years.

8. Do you only accept certain pipe materials?

Yes: .....86 percent
No: .....14 percent

9. If yes, which pipe materials are accepted?

Clay: .....26 percent
Concrete: .....35 percent
Fiberglass: .....22 percent
HDPE: .....61 percent
Iron: .....38 percent
Polymer Concrete: .....19 percent
PVC: .....88 percent
Steel: .....8 percent
Other: .....8 percent

The results here were similar to the 2008 survey. With regards to underground infrastructure work, PVC was the top response at 88 percent, HDPE coming in second at 61 percent.

10. Did you receive/or will you be receiving ARRA/ stimulus funding for your infrastructure work?

Yes: .....14 percent
No: .....86 percent

11. Have you changed your design life requirements in the last five years?

Yes: .....12 percent
No: .....88 percent

12. In your designs, do you specify pipe material?

Yes: .....91 percent
No: .....9 percent

The response of Yes to this question has been the overwhelmingly popular choice in our three surveys.

13: If yes, what type of pipe is the most commonly specified?

Clay: .....10 percent
Concrete: .....16 percent
Fiberglass: .....5 percent
HDPE: .....22 percent
Iron: .....16 percent
Polymer Concrete: .....2 percent
PVC: .....79 percent
Steel: .....5 percent
Other: .....2 percent

PVC is the clear choice among our respondents for this question with a whopping 79 percent, compared to the second most selected answer of HDPE with 22 percent. In the 2008 poll, PVC was the top choice with 80 percent over HDPE with 36 percent. In 2004, 63 percent of respondents selected PVC and 14 percent selected HDPE.

14. What type of pipe is the easiest to maintain/rehab?

Brick: .....2 percent
Clay: .....17 percent
Concrete: .....13 percent
Fiberglass: .....4 percent
HDPE: .....7 percent
Iron: .....6 percent
Polymer Concrete: .....1 percent
PVC: .....66 percent
Steel: .....4 percent
Other: .....5 percent

There's little change in the top responses over 2008. PVC was selected by 66 percent of poll respondents, with clay finishing second with 16 percent, followed by concrete at 13 percent and HDPE with 7 percent. In 2008, PVC had a similar percentage with 69 percent but was followed by HDPE with 18 percent and clay at 15 percent.

15. What type of pipe is the most difficult to maintain/rehab?

Brick: .....21 percent
Clay: .....42 percent
Concrete: .....22 percent
Fiberglass: .....3 percent
HDPE: .....5 percent
Iron: .....8 percent
Polymer Concrete: .....1 percent
PVC: .....6 percent
Steel: .....9 percent
Other: .....8 percent

A low number is what you want for your pipe with this question. Taking the top spots with our respondents was clay pipe at 42 percent and concrete pipe at 22 percent — same positions they held in our 2008 poll. Polymer concrete pipe had the lowest percentage in 2010 and 2008 with 1 percent.

16. What percentage of your sanitary sewer system do you rehab and replace each year?

The most popular answer from our poll participants was 5 percent, with many selecting 1 to 2 percent.

17. What type of pipe achieves the longest ife cycle?

Brick: .....5 percent
Clay: .....22 percent
Concrete: .....16 percent
Fiberglass: .....2 percent
HDPE: .....16 percent
Iron: .....6 percent
Polymer Concrete: .....2 percent
PVC: .....52 percent
Steel: .....2 percent
Other: .....6 percent

Once again, PVC was the most selected choice, with 52 percent. Clay and HDPE swapped second and third positions from 2008 at 22 percent and 16 percent, respectively. Concrete also had 16 percent.

18. When performing trenchless applications, do you specify pipe materials?

Yes: .....91 percent
No: .....9 percent

This percent rose 8 percent over our 2008 poll and similar to results with our 2004 poll.

19. What types of pipe do you use for trenchless projects?

Brick: .....0 percent
Clay: .....10 percent
Concrete: .....10 percent
Fiberglass: .....22 percent
HDPE: .....68 percent
Iron: .....10 percent
Polymer Concrete: .....9 percent
PVC: .....45 percent
Steel: .....7 percent
Other: .....11 percent

Like our 2008 poll, HDPE was the top selection for this question, with 68 percent, followed by PVC at 45 percent. The gap between the top 2 has closed a bit over our previous poll, though, which had HDPE at 74 percent and PVC at 46 percent. This year, fiberglass leapt into the top three at 22 percent.

20. Rate the importance of the following characteristics when selecting pipe materials for a trenchless project.

In 2010, meeting standards and longevity/design life are in a virtual tie for "extremely important" factors, finishing at 74 percent and 73 percent, respectively. They finished in the same order in 2008 but had a bigger gap between — 9 percent. In 2010, these two were followed by life cycle cost at 60 percent, ease to maintain and rehab at 53 percent, ease of installation at 50 percent, compatibility at 46 percent and initial installation cost and price were both at 41 percent.

21. Does the type of pipe material required for a trenchless installation limit the use of trenchless techniques in your system?

Yes: .....35 percent
No: .....65 percent

Results for this question are on par with the 2008 results. In 2004, just more than 71 percent responded Yes to this question.

22. What is the biggest problem you face with pipe when completing trenchless installations?

Compatibility with existing system: ..... 15 percent
Lateral connections: .....50 percent
Expense: .....28 percent
Longevity: .....4 percent
Pipe availability: .....6 percent
Pipe doesn't meet local codes: .....4 percent
Twisting: .....10 percent
Other: .....24 percent

Making the proper lateral connections finished first with this question, with 50 percent, followed by expense at 28 percent. Among the "Other" responses were: client acceptability, pipe movement over time, finding qualified installers, and future repairs.

Sharon M. Bueno is managing editor of *Trenchless Technology*.

For more information visit *www.trenchlessonline.com/info*