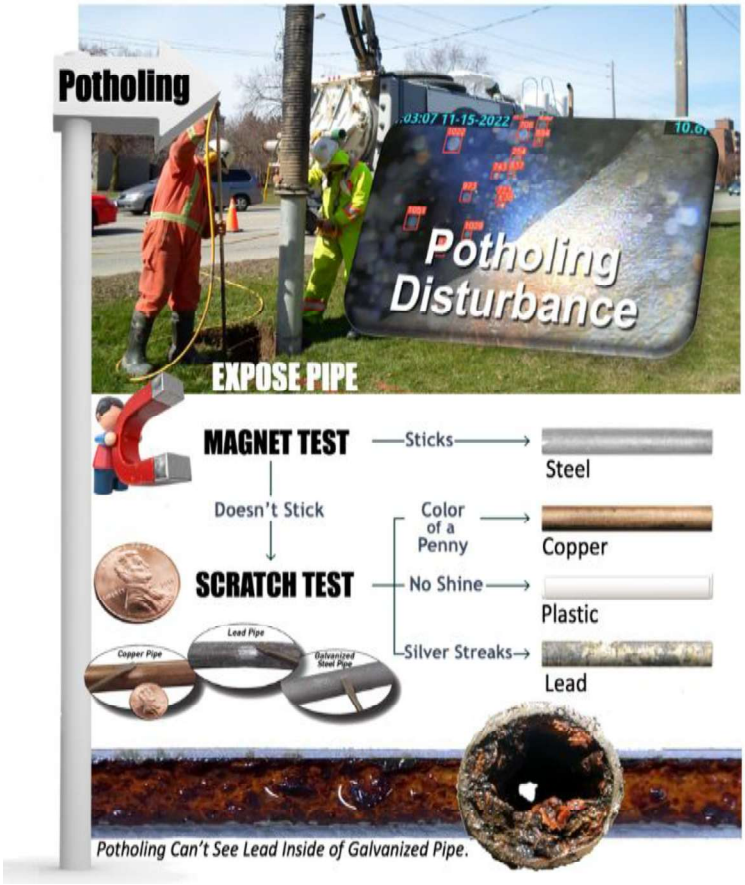
Why Water Departments Are Replacing 'Potholing' With 'Electrical Resistance Testing' to Accurately Determine Water Pipe Materials?

US water utilities are finding many drawbacks from excavating or potholing to determine pipe materials. Besides the disruption to homeowner's property to expose water service lines and visually determine pipe material, the EPA's LCRI has determined that disturbances caused by potholing must now inform homeowners of the need to flush their water line before consuming water, shown in Figure 3.

Figure 3. Advantages and Disadvantages of Potholing.



Advantages

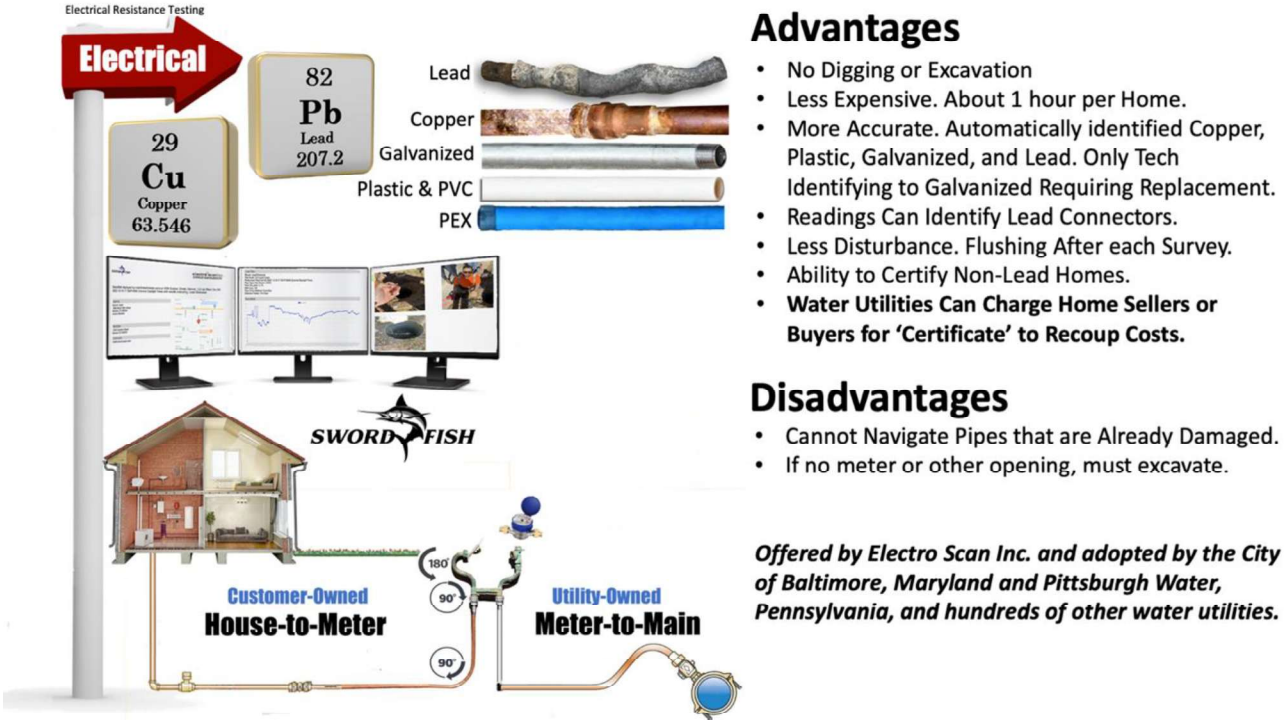
- Many Companies Offer Rhis Service.

Disadvantages

- Most Costly Alternative.
- Requires Landscaping Digging and Back Filling.
- Does Not Assess Full Pipe Length, Especially if Multiple Pipe Materials Used.
- May cause internal pipe scaling that releases lead embedded in orthophosphates, bio-film, debris.
- May hit a marked or unmarked 3rd party utility.
- Misses Lead Solder Joints & Partial Replacements.
- Customers Must Be Notified of Disturbance Inside Pipe and Take Action to Flush Their Own Line.
- Unable to Determine Galvanized Pipes Requiring Replacement (GRR).
- Must dispose of contaminated soils.
- GIS or Mapping Inaccuracies May Require Multiple Holes to be Dug.
- Impacted by frost or water bans.
- Typical manual notes harder to QA/QC.

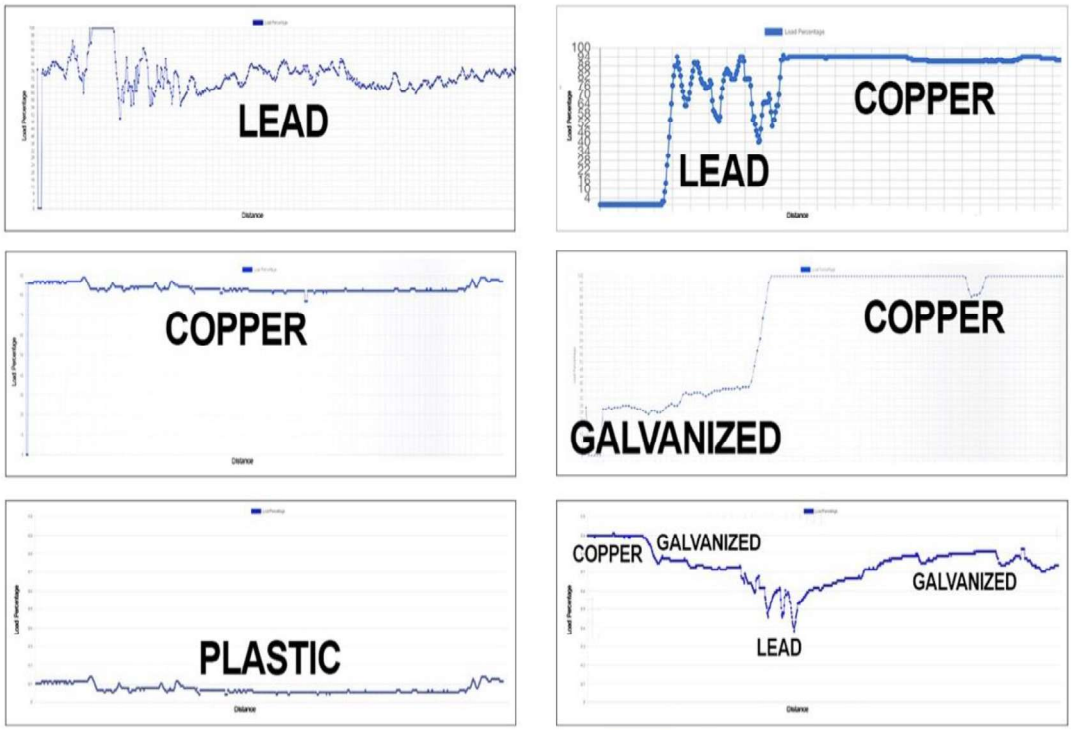
In contrast, the use of Electrical Resistance Testing, provides 100% accuracy in identifying one or more pipe materials in the same pipe, allowing water utilities to confidently certify non-lead water service lines or required replacements, with advantages and disadvantages as shown Figure 4 (Below).

Figure 4. Advantages and Disadvantages of Electrical Resistance Testing.



As shown below in Figure 5, Electrical Resistance Testing automatically identifies one or more pipe materials, including lead components – a key requirement of the new LCRI.

Figure 5. Single Pipe Materials and Multiple Pipe Materials Found in Water Service Lines.



The SWORDFISH Solution

Figure 6. SWORDFISH solution for buried lead pipe detection.

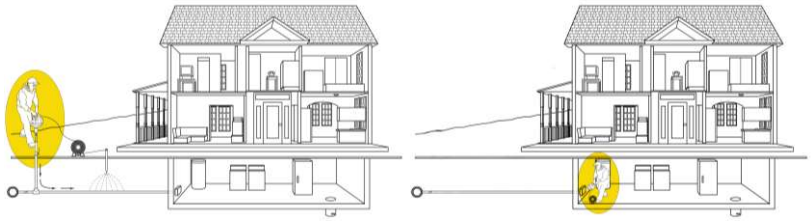


As illustrated in Figure 6, Electro Scan, Inc.'s SWORDFISH is the first hand-held buried lead pipe detection tool and cloud reporting solution that enables the accurate identification of service line pipe material without breaking ground. Applying their patented and internationally recognized low voltage conductivity technology, this cutting-edge technology was adapted to enter smaller diameter pipes to easily detect pipe materials using electrical resistance testing. Releasing its focused array of low voltage current (approximately the equivalent of six AA batteries), this high frequency electrical current of 10 volts and 40 milliamps measures the change in electrical resistivity in pipe materials as it moves through the inside of a pipe.

Included as part of the American Water Works Association (AWWA), M77 Standard for Water Main Condition Assessment and referred to as low voltage conductivity, the technology automatically recognizes copper, lead, galvanized steel, and plastic pipe materials, without human interpretation. Taking into consideration that lead has a different resistivity than other pipe materials, electrical resistance testing is an effective tool to detect lead service lines. This is then confirmed with a touch contact swab using the 3M Lead Test Kit.

The innovative design allows the inspection of water service lines measuring from ½ to 3-inch pipe diameters accessed through either basement or curbside entry points (Figure 7) with the ability to navigate multiple 90° bends in lengths of up to 80 feet with a standard pipe entry.

Figure 7. Curbside Entry (Left) and Meter Entry (Right) into Water Service Line.



Typical set-ups for SWORDFISH inspections, either from the curb or basement.

Electro Scan's patented machine intelligent technology measures the change in electrical resistance of pipe materials as it moves through the inside of a pipe to accurately locate buried lead pipes.