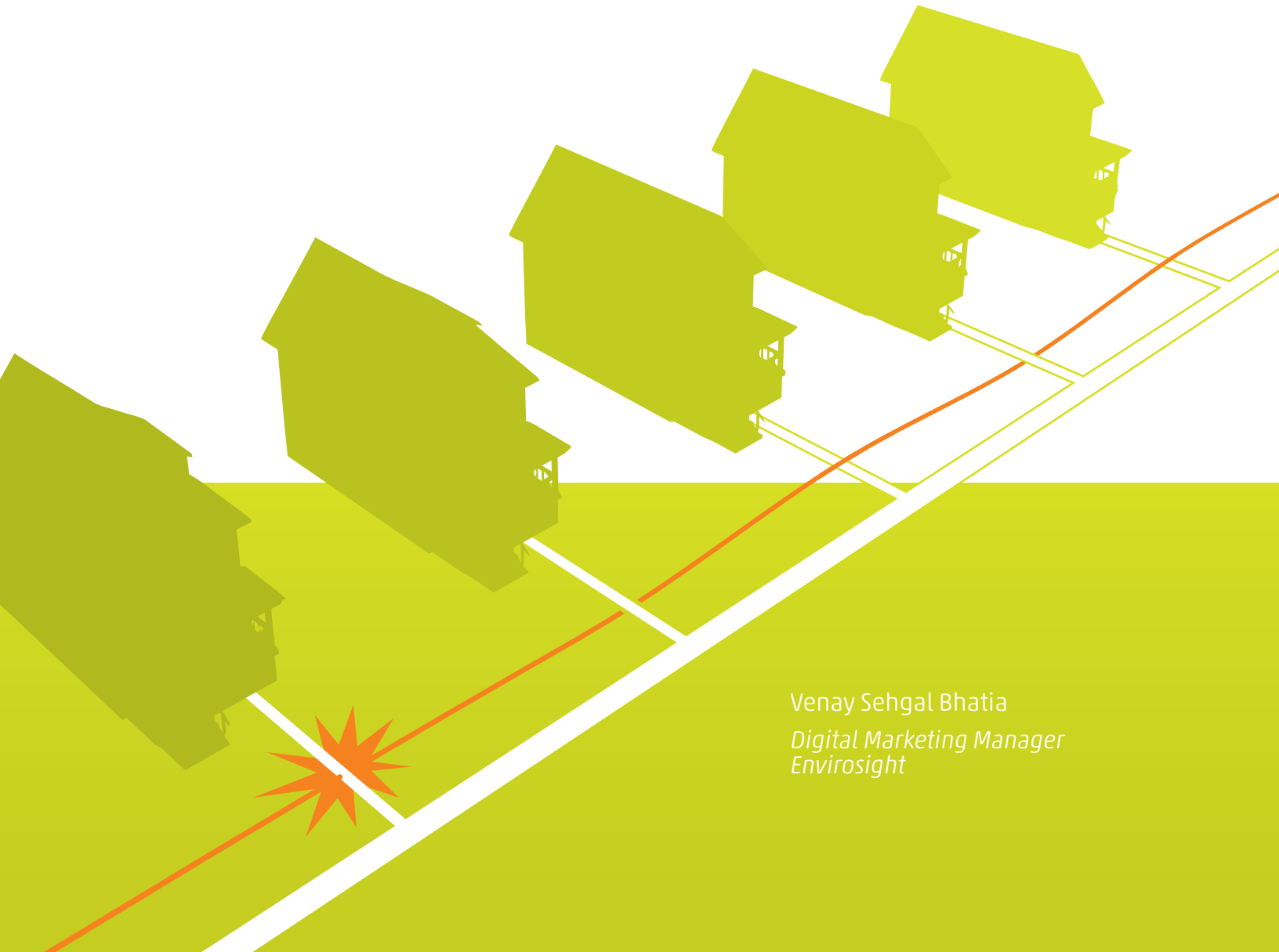
Envirosight

Digging Deep

The Growing Market for Cross Bore Inspection Services.



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Eliminating cross bores is a top priority for the sewer and utility industries. Yet, finding a contractor that performs cross-bore inspections is increasingly difficult. The few contractors that do perform them are typically inundated with large projects and unable to meet demand. This paper aims to introduce cross bore inspection to sewer inspection companies looking to grow business by adding high-demand services.

The Demand

A cross bore is defined as the intersection of underground utilities. Technically, a cross bore can occur between any underground utilities, including (but not limited to): electric, communication, sewer or gas—however, it is most dangerous when a gas line intersects a sewer. For this paper, "cross bore" refers specifically to a gas line intersecting a sewer.

Trenchless technologies like horizontal directional drilling (HDD), percussive moles and plowing are used for the installation, replacement and renewal of underground utilities with minimal excavation and surface disruption. Horizontal directional drilling, the most common method for installing gas lines, creates a pilot bore and reams it in one or more passes to a diameter suitable for the gas line, which is then pulled into the prepared bore (NASTT). Gas distribution lines have been installed by trenchless methods for over 30 years. These methods pose minimal disruption to yards, roads, driveways, traffic, and trees, and they cost significantly less than other installation methods (Cross). However, because these methods do not allow for visual observation of the utility being installed, they can also cause cross bores (Bruce 2012).

A cross bore can remain dormant until a sewer backup occurs. Clearing the backup can inadvertently rupture the gas line. A ruptured gas line can then leak explosive gas into a home or business via the sewer lateral. Gas companies that use trenchless methods of pipe installation consider cross

bores a threat that must be assessed continuously (McCormick). One of the biggest cross bore disasters resulted in two young girls being severely burned, and subsequently awarded a claim payout of $30M—making it the highest paid claim for a cross bore explosion (Bruce 2012).

According to the Gas Technology Institute, there have been 18 accidents resulting from cross bores from 2002 to 2015—a number the Cross Bores Safety Association says is likely an understatement (Bowe). Results of many cross bore inspection projects show that in high-risk areas, there are an average of two to three cross bores per mile of sewer line. Large communities can have anywhere from 1000 to 6000 miles of sewer lines (Bruce 2008). As the reliance on trenchless technology installation methods continues to grow, the demand for services to help mitigate cross bore risk will grow with it. The stakes are too high to let cross bores go undetected.

The Variations

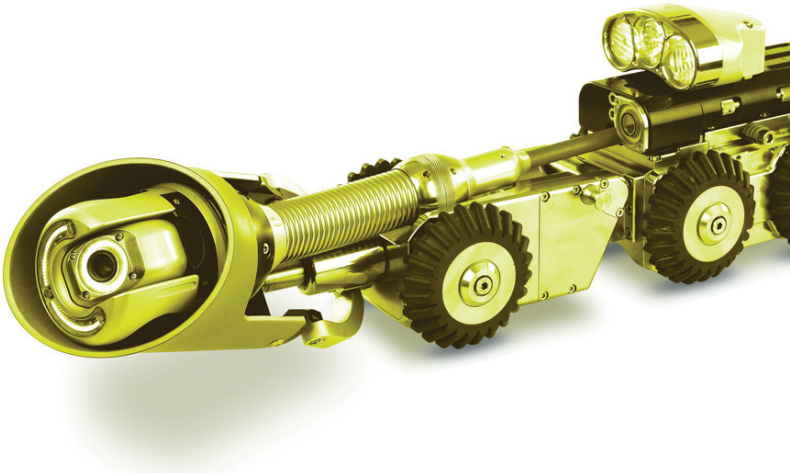
There are two types of cross bore inspection programs: new construction and legacy.

Construction companies and gas utilities require cross bore inspection services to map the utility pipes underground and mitigate cross bore risk when installing new gas lines. Essentially, construction engineers need to know the precise location of sewer laterals and other utility lines to minimize the danger of boring a new gas line through them. All states have some regulation in place requiring utilities to locate sewers before they do trenchless pipe installations—most recommending both pre- and post-installation inspections (Bruce 2008). General contractors are increasingly requiring visual confirmation of the absence of cross bores before taking ownership of construction projects (McCarthy). Simply put, new construction inspection projects help prevent new cross bores.

Legacy cross bore inspections are done to see if cross bore damage has already occurred. Before the late 1990s, the risks associated with cross bores were relatively unknown—therefore, gas line installations were done without safe cross bore mitigation practices. Millions of miles of sewer lines have been potentially intersected with gas lines placed by trenchless methods, which means there are at least thousands of undetected legacy cross bores (Cross). These cross bores are not only a ticking time bomb, they can also cause structural damage to the sewer line, leading to I/I and ultimately sinkholes and voids. Legacy cross bores are systematically addressed through inspection and elimination programs (Hixon). Cross bore inspection contractors have the potential to compete for large projects of thousands of laterals as the industry tries to mitigate legacy cross bore risk.

The Requirements

The barrier to entry as a cross bore inspection services provider is relatively low for current sewer inspection contractors, and consists primarily of additional equipment and training.



Investing in the right equipment is crucial to the success of any underground inspection services company. Equipment needed for cross bore inspection includes:

- *Lateral Launch Inspection Crawler:* Cross bore inspections are typically done with a lateral launch inspection crawler (McCormick). Such a system is capable of launching a camera up lateral connections from a main line so cross bore inspections can be done from the street, rather

than requiring residential or clean-out access. Having a main-line system such as a ROVVER X sewer inspection crawler that can be upgraded to a lateral launch system is preferred, as it will lower startup costs, as well reduce equipment clutter and maintenance costs.

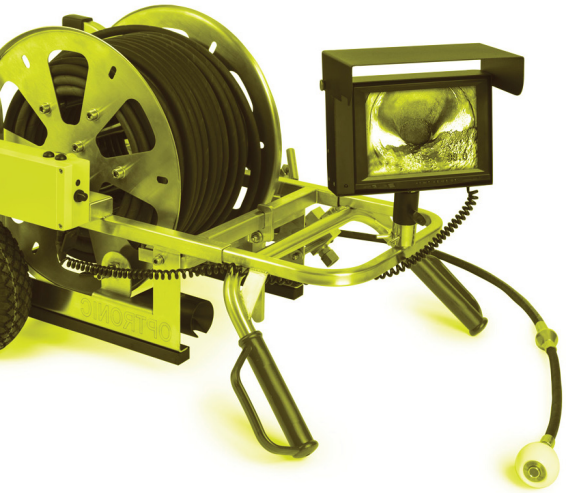
Lateral launch systems are the equipment of choice when inspecting for cross bores. You can inspect multiple laterals in quick succession while the crawler is in the main line, and there's no need for access from a clean-out or residence.

> *Using the same manufacturer for all your equipment makes it easier to scale your capabilities and cross-train your staff. Standardizing on an equipment brand allows your company to grow and move into new markets quicker.*
>
> *Mark Mason,*
> *Blood Hound Underground*

Adding lateral launch capability can cost anywhere from $100,000 to $300,000, depending on whether your existing system can be expanded, or whether you invest in a new dedicated system. When evaluating lateral launch systems, look for the following features:

- Steerable six-wheel drive to help maneuver the crawler to troublesome launch points,
- Pan/tilt lateral launch components that maximize visibility in constricted areas,
- Force-sensing rollers to prevent damage to the push rod,
- Illuminated rear-viewing camera to help navigate out of the mainline and manage cables during reverse crawl, and
- Built-in multi-frequency sonde for easy locating.

- *Pan/Tilt Push Camera:* Inspection crews prefer a pan/tilt push camera if they need to access the lateral through a residential clean-out, particularly if the lateral is blocked from the main line. Going from clean-out to clean-out to perform inspections is inefficient, and should be done only when lateral launch inspection is not possible. A pan/tilt push camera runs $15,000 to $30,000. Look for the following product features:
    - Pan/tilt capabilities that maximize visibility in constricted areas and help maneuver around obstructions,
    - Adjustable LED illumination and focus to better see defects,
    - Multi-frequency sonde transmitter for easy locating.
- *Jet-Propelled Drain Camera:* Although most cities have main-line pipes that are at least 8 inches diameter, some older cities have lines that are less than 6 inches, and which have deteriorated or been relined multiple times. In such situations, it is difficult to maneuver a lateral launch system through the pipe, and inspection crews prefer using a jet-propelled drain camera (Fougerousse). These camera systems are essentially push cameras propelled by jetted water, and they have nozzles allowing them to steer through junctions and hover over debris. These cameras can successfully navigate



lines as small as 2 inches with multiple tees and bends. The distance range of this technology is 200 feet. A jet-propelled drain camera runs between $20,000 and $30,000. Look for the following product features:

- Wide field of view,
- Sonde transmitter,
- On-screen footage display for real-time feedback,
- In-pipe centering capability, and
- Shadowless LED illumination.

Hiring and training the right people to perform cross bore inspections is as important as investing in the right equipment. "An excellent main-line crawler operator doesn't necessarily have the skills to be a great lateral launch operator," says Mark Mason, owner and operator of Blood Hound Underground. "Lateral launch equipment operators need to have good eye/hand coordination to be able to launch into laterals accurately." Selecting the right team can mean accurate and speedy inspections, which save the contractor time and money. Adequately training your crew on proper equipment handling and preventative maintenance can help maximize uptime.

> *"Don't wait for things to break. Be proactive with fixing equipment and be diligent with your company's preventative maintenance practices."*
>
> *Mark Mason,*
> *Blood Hound Underground*

The Clients

Even though cross bores impact municipalities, the liability for them falls on gas utilities. One mistake new contractors make when looking for cross

bore inspection projects is to rely solely on their municipal contacts. There is a consensus within the industry that a cross bore is the responsibility of the gas utility (Hixon). Therefore, gas utilities are increasing record-keeping, performing pre- and post-boring inspections, and maximizing efforts to find legacy cross bores (McCormick).

> *Account for depreciation and insurance when bidding projects. Hidden costs will impact profitability.*
>
> *Andrew McCarthy, Standard Equipment*

General contractors also hire utility locating companies to help find where underground utility lines are, and to televise those lines so that they can prove no new cross bores were formed during construction projects.

The Opportunity

Cross bore inspection projects can be lucrative. One Envirosight customer was recently awarded a project for 7000 laterals worth more than $1,000,000. Generally, project bid amounts are determined by (Hixon):

- A clients' budget, schedule, risk tolerance and regulatory requirements,
- Location and size of the project, and
- Whether the inspection will be done main-to-structure or structure-to-main.

The pricing model for cross bore mitigation projects can be per-lateral or per-main-line-foot.

- *Per-lateral:* Gas utilities and general contractors typically pay between $200 and $300 per lateral for cross bore locating and inspection

projects (Bruce 2012). The price depends on factors such as the number of cross bores to be inspected, whether there is union representation, and if there are specific requirements.

- *Per-main-line-foot:* Some gas utilities end up paying $1.00 to $2.00 per foot of main line pipe inspected (McCarthy).

Whatever the pricing model, a contractor must take into account the time required to perform such inspections, wear and tear on the equipment, and any surprises that may occur while performing the inspection. Due to the harsh environment in which cross bore inspection equipment operates, comprehensive care and preventive maintenance are essential. Winning financially on cross bore inspection jobs depends on how effectively and efficiently the project is completed—not accounting for down-time can be very expensive. It is also crucial to budget time and money for maintenance. The amount to budget depends on the system, how heavily it is used, and whether the user conducts preventative maintenance. On average, contractors budget $30,000 to $45,000 per system for yearly maintenance and repairs (McCarthy).

- $15,000 to $35,000 for preventative maintenance and wear items.
- $15,000 for emergency repairs.

An Untapped Market

Cross bore inspection programs are gaining momentum. Sewer inspection companies may find it worthwhile to add cross bore inspection to their suite of inspection services to capitalize on the increasing demand. General contractors and gas utilities will continue to hire cross bore inspection contractors so long as trenchless methods are used to install gas lines.

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