



# **WATER LEAKAGE – WHY A NEW CATEGORY OF PRODUCTS IS ESSENTIAL**

## **White Paper**

## The specter of water leakage has come back to haunt

Due in part to recent climate change and other factors such as increased urbanization and industrialization, water utilities worldwide are struggling with water stress - the negative water balance between supply and demand. Countries that in the past were blessed with an abundance of water, such as the UK and the US, have been afflicted in certain areas and in the traditionally water-stressed regions of the world the situation has mostly worsened and, in some cases such as China, have even become critical.

In situations such as these, a holistic approach is sometimes the only viable one. It requires addressing the problem from multiple angles including areas which, to date, have been largely neglected. One area of consistent neglect is leakage of water from pipes. This has resulted in unsustainable and wide-scale inefficiencies of water supply. A particularly insidious trait of water pipe leakage is its tendency to grow over the years literally under our very feet. One might say that the specter of rampant leakage has come back to haunt with a vengeance.

Since leakage control is challenging and, until recently, perceptibly avoidable, very little effort and resources have been devoted to developing technological advances in the field. This lack of due attention has created a technological vacuum which, only recently, has drawn major interest within the industry. The lion's share of recent developments have been new technologies for leak detection, monitoring and inspection which provide important network diagnostic capabilities hitherto lacking.

However, as important as these diagnostic tools are, what is still sorely lacking is the equivalent technological advancement in repairing and curing water leaks. Sadly, over the last 5 decades, no new technology breakthrough in water pipeline repair has been commercialized. Curapipe is one of the few commercial companies that has dedicated its efforts to changing this paradigm.

## There is leakage and there is leakage

In recent years, the study of leakage in pipelines has highlighted important insights that lay the basis for leakage control. The traditional approach to leakage control was more associated with the repair of bursts in mains that surface and disrupt our daily routine. Two other major factors were serviceability of water supply to consumers and water conservation. Contrary to common perception, no more than 10% of lost water from leakage actually surfaces.

As a result, a more proactive methodology of detecting leaks and fixing them ("find-&-fix") has become the standard approach coupled with water pressure reduction, when possible. However, active detection of leaks only accounts for an additional 20% of the total leakage. The remaining bulk of leakage is commonly deemed too small to detect and too costly to repair to warrant additional attention. That is until now.

The size of total water leakage in water mains has reached staggering levels due to the difficulties in detecting small pinholes and cracks in underground pipes. Even though they are small, these holes can typically leak say a 0.5 cubic meters every hour of premium treated drinking water and there are thousands of them out there going about their nasty little business. If you take London, for example, this totals a mind boggling loss of 650 million liters per day despite huge efforts by Thames Water to mitigate! Unfortunately, London is not the far-out exception.

Compounding the problem is lack of means that are fit for purpose. Put differently, current products and interventions are not geared to deal with bulk levels of leakage. Pipeline replacement conceivably "roots out" the problem but leakage-driven replacement is prohibitively expensive and disruptive to boot. In the UK, for example, there are more than 210,000 miles of water pipes which, according to Ofwat, would cost £100bn to replace.

Clearly, the industry has a compelling need for a new and effective intervention category to take its rightful place within the leakage control toolbox to successfully combat bulk leakage.

## The makings of a new product category

The purpose of the new product category would be to reduce bulk levels of leakage as low as technology and cost effectiveness permit. This is no small feat and clearly requires a revolutionary approach.

The key to the revolutionary approach is in the way the pipeline is perceived. In current thinking the pipeline is the problem. In the new approach it is also the solution. How so? It provides an effective internal conduit and unfettered access to even the smallest leak from the inside. This internal conduit can be conveniently accessed from a fire hydrant, for example. What is required is an intervention platform that leverages this internal conduit to move from one leakage area to another and somehow plugs the leaks.

True, easier said than done, but consider the possibilities. No need to dig up the road or pavement (a Trenchless approach) which now is no longer an obstruction to detecting and repairing small leaks since it is all done from within (a “Trojan Horse” approach?) and the possibility to deal with multiple leaks along the route (“killing two leaks with one stone”). And, yes, it has to be cost-effective.

Clearly, the motivation for this category is great. But first let’s give this category a name. Let’s call it Trenchless Automated Leakage Repair or, in short, TALR. TALR would be positioned as a category that:

- Is **Trenchless** (no dig) which ensures low social and environmental disruption
- Enables **Automated** detection, sealing and permanent curing of leaks
- Is a **Low-cost alternative** for pipe replacement/renewal
- Provides for **Rapid bulk reduction** of leakage

Bulk leakage reduction is essentially an extremely compelling value proposition above all other methods of water efficiency. Not only does it save water on a large-scale, as its name implies, but it can lead to saving tens of megawatt-hours of energy daily and, with it, an essential reduction of greenhouse gas emissions not to mention saving tens of tons of water treatment chemicals each year.

## Curapipe leads the way

Curapipe is pioneering the way by being the first to commercially introduce a TALR category intervention. This has not been an easy task. It took some 40 man-years of research and testing to overcome the many challenges such as:

- Address multiple leaks of differing types:
  - Corrosion induced pinhole leaks (ferrous pipes)
  - Leaky joints (lead-run, flanges)
  - Longitudinal and circumferential cracks
  - Ring fractures
- Low grade pipes with high levels of tuberculation
- Different types of pipes (e.g. CI, DI, AC, MDPI)
- Negotiate complex networks, branches, service pipes
- Meet water certification and H&S standards
- Leave no footprint on the interior of the pipe (except leak cures)
- Robust and enduring leak cures
- Rapid deployment and low cost to deploy

The intervention is provided as a service to water utilities in conjunction with local delivery partners.



## For more information

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