

Curapipe System Ltd. - Israel

WaterTech Virtual Exposure Event Singapore March 24,th 2021

Curapipe for Trenchless Automated Leakage Repair (TALR)

CURAPIPE

can reduce water loss in Urban potable water distribution systems by at least 75%*

Speaking of Water Loss?

*92% at work done in Italy (2019)

A fully developed technology (TRL7)





5 Skilled and experienced PhDs innovators conceived the methodology



Israel

2271

Co-developed

solution with

Thames

Water in

London



Enabling Platform

buildup:

Accreditation,

Methodology &

Training, IP,

Investment



Commercializing in Israel, Italy, South Africa, The U.K. Other regions negotiated

2007 2007-8

2010-11

2017-18

2019-20

Over 100 Pipe sections have been successfully treated, demonstrating annual leak reduction of about 1m ft3

Traction – Proving the Commercial Potential

PIPECARE TALR TECHNOLOGY	SSS services	aquicure etter		
 Italian licensee as of 2017 Fully certified Successful pilots with many utilities (A2A, AQP, Cap Holding, Acqualatina, Veritas,) 2019 commercial 3.7km 2021 commercial forecast is over 15km 	 UK and Irish licensee as of 2018 Full certification underway Planned pilots with major water companies Anglian Water, Severn Trent, United Utilities, South Staff 	 South African licensee as of 2017 Fully certified Successful pilots in East London, Ladysmith, Emalahleni 	 Israel Successful pilots in Rosh Pina, Beer Yaakov Additional successful pilots done by Curapipe's team in Jerusalem Water Hagihon 	 Mexico licensee as of 2021 In training process In certification process

Q: Why is Innovation required? A: To support Bulk Leakage Reduction (BLR)





Die

Repairing from within the pipe!

Trenchless **Automated** Leakage Repair (TALR)

PIG

"A game-changing low cost and durable trenchless repair solution for accelerated bulk reduction of leakage levels"

> No direct competition/ similar product

Bulk Leakage Reduction To achieve Bulk Leakage Reduction Curapipe applies TALR technology Trenchless Automated Leakage Repair (TALR) is designed to:

- 1 Address multiple leaks within a treated pipe section in a single intervention
- 2 Seal differing **types of leaks** on different types of **pipe material**, found in **mains** as well as in **laterals**
- 3 Systematically address Leakage in known leaky areas with no detection requirement and no, or minimal disruption

TALR Video Clip





PIG

How It Works

Ground Level







The PIG train is launched into a pipe section via an upstream Insertion point Upstream Fire Hydrant

3

PIG

How It Works

Downstream Fire Hydrant



Ground Level

Curapipe's curing substance automatically seal and permanently cure the detected leaks





- 3mm Hole
- 570 l/h
- 4 Bar

Treated Pipe Section length: Up to 400 meter

Treatable mains: DN50 to DN200

Tuberculation levels on mains: Up to 50% of internal diameter



Example #2 100mm Flange 400 l/h 3.5 Bar

Network pressure: 1 – 8.5 Bar Intervention pressure: 1 – 4 Bar

Typical applied materials types: CI, DI, AC, MDPI, PVC



Example #3

- 19mm Fracture
- 7 x 3mm Holes
- 2500 l/h
 3.8 Bar

Individual leak types: Internally and externally corrosion-induced pinholes, lead-run cast iron joints, split bell, longitudinal and circumferential cracks, flanged and laterals connection joints.



Example #4

- Lateral
- 3mm Hole
- 340 l/h
- 3.8 Bar

Treatable laterals: DN10 to DN50

Length of leaky lateral connected to mains: Up to 25 meter

Number of connected laterals:



Deployment - Equipment

LeakBuster Launcher

Sight Tube Pressure Gauge Flow meter (0-600L/hr) Flow meter (600-6000L/hr)

Outlet



Bleed Valve

Low Viscous Gel PIG

Curing Substance Hi-Viscous

Gel PIG

Deployment - Equipment



Outlet

Global Footprint



- Piloted in Israel, Italy, South America, South Africa and the U.K.
- Product accreditation in Israel, Italy, Brazil (NSF61), South Africa and the UK (BS6920)
- Pending accreditation in USA (NSF/ANSI 61, NSF372), France (ACS)
- Testing in the UK validate longevity of at least 10 years.
- 30 Patents issued in U.S. and in other jurisdictions

Longevity Testing



- Test simulated pressure changes typically occurring four times per day
- 10 years equivalent of constant pressure cycling experienced by in-service pipelines



- 7,300 cycles were performed between 120 to 180 psi representing 10 years of longevity
- No breaking of seals!
- Testing done by reputable UK lab: AES advanced engineering



Case Studies

Curapipe for Trenchless Automated Leakage Repair (TALR)

aquícure

exxaro



CASE STUDIES

South Africa

aquícure

Emalahleni Pilot - March 2019

In March 2019, Aquicure was contracted to execute a Pilot Project to demonstrate the TALR technology at Emalahleni Clear Water Estate. Aged infrastructure, financial constraints and extremely high water losses have all contributed to current service challenges in the area. The municipality has three key water supply systems i.e. Witbank, Ga-Nala / Kriel and Rietspruit, with a significantly high recorded water loss volume. Fully aware of the challenges of conventional 'find and repair' methods, the group were looking for a unique and efficient solution which Aquicure provided.



Section Treated	Street Name	Length (m)	Pipe Diameter (mm)	Туре
1	Marlin	406	110	PVC
2	Coral Trout	316	110	PVC
3	Guppy	348	110	PVC
4	Beardfish	360	110	PVC
5	Baracuda	512	75	PVC

aquícure

Emalahleni - Summary of Results

75,713	423,991
Liters water	USD financia
saved	savings
annually	annually
1,942	100
meters of	percent leaka
pipe length	reduction
treated	achieved



Insights

- The results indicate a total leakage reduction and water conservation of 75713 kl per annum and financial savings of circa USD 423 991 per annum.
- Based on the assessment of this as a commercial project, Emalahleni local municipality's return on investment (ROI) would be realised in under 6 months of implementation.

La tecnologia TALR per la riparazione automatica senza scavo delle perdite

Technology PIPE





Pilot Data



- A2A is a leading Italian multi-utility serving the City of Brescia and the province
- The city has thousands of km of old water pipes
- Many of the steel and cast iron pipes are very leaky and need to be repaired





26

Pilot Data

- April 2019 A2A contracted Pipecare to do a bulk reduction pilot to validate the TALR solution
- Three sections of pipe totaling 1,010 meters were chosen



27



Pilot Data

Pig Train Extraction Point Retriever

V2

P3

Technology Pipe

Pipe Section 1

440 meter long, running down a45 meter elevation; service

Pig Train Insertion Point

V1

Launcher



Material: cast iron

Leakage: 8,900 Liters-per-hour!

Measurements taken during the intervention indicated the presence of four different leaks. The leakage levels were:

- 1. 1700 l/h
- 2. 500 l/h
- 3. 4800 l/h
- 4. 1900 l/h
- Total: 8,900 l/h.





Results: Total Sealings!

TOTAL SAVINGS: BUILK Leakage 89.8 million litres-per-year or 0.25 MLD Reduction Reduction

inology DIDe

of a one kilometer (1 km) long cast iron water pipe leaking over 10 cubic-metres-per-hour

	Leakage level	Total savings per hour after TALR intervention (100% success rate)	Total savings per annum
Pipe Section 1 (DN 80)	8,900 litres-per-hour	8,900 litres-per-hour	78 million litres
Pipe Section 2 (DN 80)	150 litres-per-hour	150 litres-per-hour	1.3 million litres
Pipe Section 3 (DN 80)	1,200 litres-per-hour	1,200 litres-per-hour	10.5 million litres



License the product to a local partner in each country against a **onetime license fee**

Licensee provides the • service to water utilities

Train the licensee to • apply the intervention according to a detailed methodology

- Supply licensee with equipment and materials
- Provision of ongoing frontline and backline support Field technician support services

Pricing Materials & Equip.

- Materials are sold as Launching Kits per diameter ranges (Low, Medium and High Diameter Range).
- A team of 3-4 with a dedicated TALR Equipment set can execute 1-2 sections a day totaling some 1,200 – 2,000 meter of TALR per working week.
- The cost of a **TALR Equipment** set is **\$34K-\$38K** (Mobilization costs not included).





Seals and cures all types of leaks and pipe materials



Extends assets life - as cure is tested for 10 years longevity



Multiple leaks can be sealed on 400 meters of the main pipe and laterals - in a single intervention



Accredited for drinking water use

