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REDUCING WATER LEAKAGE

Victoria Road, Melbourne, a DN500 watermain burst!
TWO Days to repair! When? Thursday 11th July 2019

THE STATISTICS

- In Australia
  - ~100 litres per connection per day real water loss
  - 22 Watermain breaks per 100km
- Globally
  - 125 litres per connection per day real water loss in the UK
  - 250 litres per connection per day real water loss in the USA
- Energy and Water
  - 4% of global electricity consumption was by the water industry in 2014
  - 60% of this was for extraction and distribution
  - If all countries reduce water leakage to less than 6% the energy savings are 130TWh, the entire energy needs of Poland

HOW TO CONTROL LEAKAGE?

- There are four key opportunities to reduce leakage in any system

1. Active Leakage Control
2. Pipeline and Assets Management
3. Speed and Quality of Repairs
4. Pressure Management

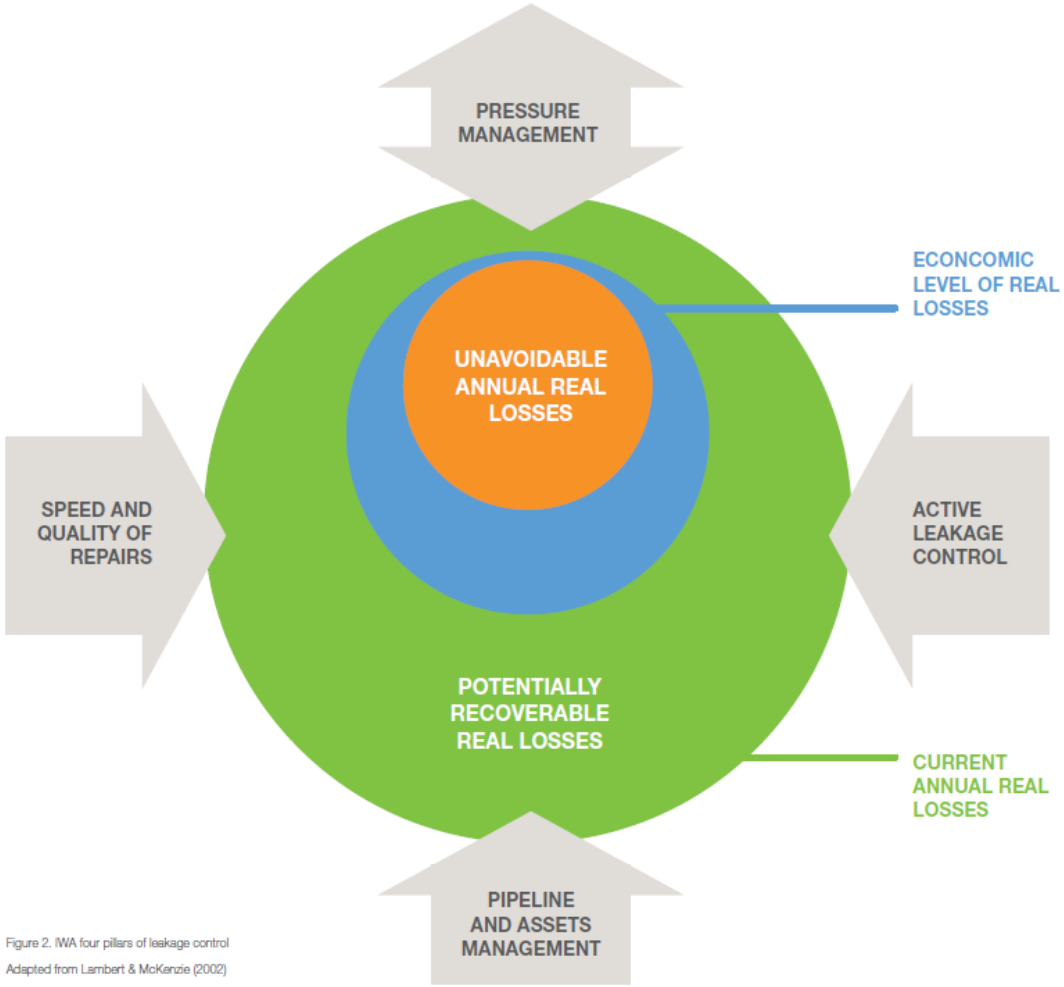


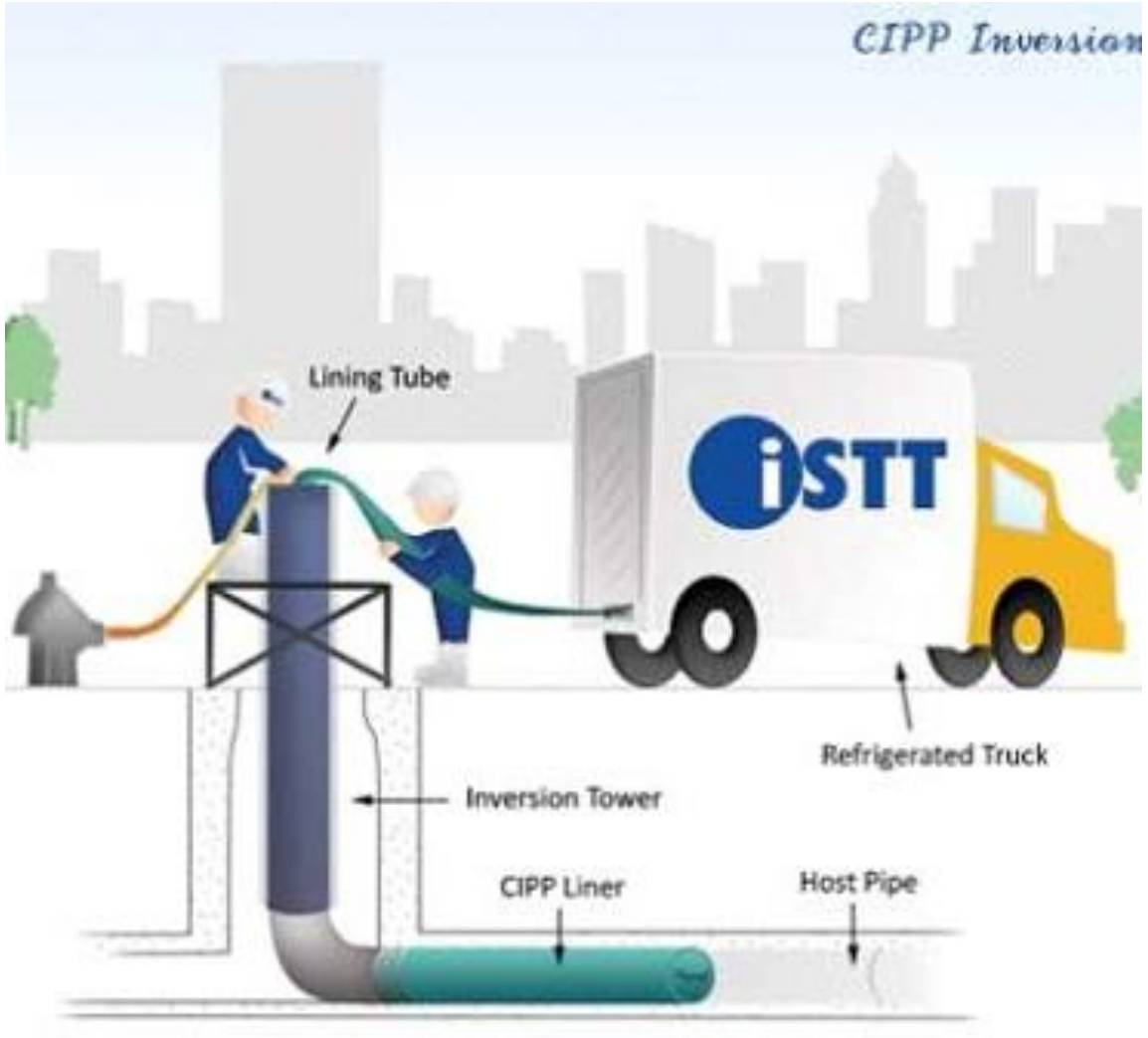
Figure 2. IWA four pillars of leakage control
Adapted from Lambert & McKenzie (2002)

ACTIVE LEAKAGE CONTROL

- This is the ongoing and real time management of a pipeline system
- It enables the identification of a leak before it becomes a larger leak resulting in lower costs associated with repair works
- Data is collected and used to narrow down the area of the leak
- “Smart” technology is used to collect the data that includes smart meters, mass flow meters, acoustic sensors, mass pressure sensors and pressure transient sensors to name a few

PIPELINE AND ASSET MANAGEMENT

- Asset management, understanding how assets are performing via collection of good data and systems
- Good active leakage control monitoring, so informed decisions about “what next?” question
- Aging infrastructure comes the risk of increased leakage, raising the question when to commence a renewal program
- Renewals of pipeline infrastructure is a significant capital cost and with improved quality data available will reduce the overall cost of a renewal
- New technologies are being developed to reduce the cost of renewals such as pipe relining



SPEED AND QUALITY OF REPAIRS

- The longer a leak takes to repair the greater the water loss and disruption to the customer
- The quality of the repair is also a significant factor
- Poor repairs, inappropriate product increases the likihood of a repair failing resulting in further water loss and disruption to the customer as well as higher costs to the water utility
- Water meters, even basic meters, are a great way to identify water leakage as the consumer will notify the water utility if they believe their water usage is higher than what they actually consumed
- Multi-use and permanent pipe repair products for maintenance teams gives them the opportunity to repair the leak immediately without having to return to site

PRESSURE MANAGEMENT

- Higher pressure and cyclic pressures increase leakage rates bursts
- Pressure management multiple stakeholder benefits
- A positive impact if any of the other three strategies are also in place
- PRVs are the simplest technique to reduce pressure
- Micro Hydro-Electric products may become an alternative to PRVs
  - They capture excess pressure and turn it into electricity, reduced operating costs

PRESSURE MANAGEMENT: REDUCTION OF EXCESS AVERAGE AND MAXIMUM PRESSURES						
Conservation Benefits		Water Utility Benefits			Customer Benefits	
Reduced water flows		Reduced Frequency of Bursts and Leaks				
Reduced Consumption	Reduced Flow rates of leaks and bursts	Reduced repair and maintenance works	Renewals either deferred or not required and extended asset life	Reduced cost of Active Leakage Control	Reduced customer complaints	Reduced plumbing issues for customers

WHICH APPROACH IS BEST?

- A combination of all four strategies will have the greatest leak reduction outcome
- Pressure Management and/or Active Leakage control are the most cost effective strategies and have the greatest impact in reducing water leakage
- Pressure Management
  - 1.4% reduction in leak flow rates for every 1% reduction in pressure
  - 1% reduction in burst frequency rate for every 1% reduction in maximum pressure
- Active Leakage Control
  - Smart water network implementation in SA CBD
  - Integrating 400 sensors across SA CBA with a analytics platform to monitor system
  - In first year it prevented
    - 20 plus watermain incidents
    - Reduced reactive work by 70%
    - 50% in savings delivered by undertaking proactive work versus reactive repair

A FINAL WORD

- There is a great opportunity for the Pacific Region to leverage the advancements in technology, new and innovative products available and under development

- Coupled with all the new learnings taken from case studies from around the world to develop plans that can be applied to your water network needs and requirements

- Resulting in positive outcomes in the reduction of water leakage as well as the reduction in the overall operating and maintenance costs to deliver water to your customers

Acknowledgments

- Reducing Leakage in Australia – Water Services Association of Australia
- Bureau of Meteorology – National Performance Report 2-17-18 Urban Water Utilities
- International Energy Agency – Water energy nexus 2016