



Preventing Water Waste: Analysis of Leak Detection Systems for Underground Sanitation Networks

Universidad Tecnológica Nacional – Facultad Regional Paraná

Students of Civil Engineering

-Delfina Eichhorn

-Micaela Weber

English II - 2023

This work is an EFL student project. The pictures in this presentation are only used for educational purposes. If there is a copyright conflict, they will be immediately removed.

Introduction



- Waste of water



- Leaks in the underground network



- Sustainable Development Goals



- Leak detection system

Thesis

In order to prevent water waste, it is essential to discuss the implementation of leak detection systems for underground sanitation networks



Purpose

Discuss leak detection systems for underground sanitation networks



Map of the Presentation

Section One



Description of the problem

Section Two



Possible solutions

Section Three



Most efficient system



Contribution

Contribute to the analysis of solutions to leaks in underground sanitation pipes in the civil engineering field



Analysis of Leaks in the Sanitation Pipes

Loss of water due to broken pipes



Old and weak pipes

Aggressive weather conditions



Main Factors of Pipeline Failures

Pipeline failure



Intrinsic to the pipeline

Operational

Environmental



Circumferential break on an asbestos cement pipe.



Longitudinal split on a polyvinyl chloride pipe.



Corrosion pin hole on an iron pipe.



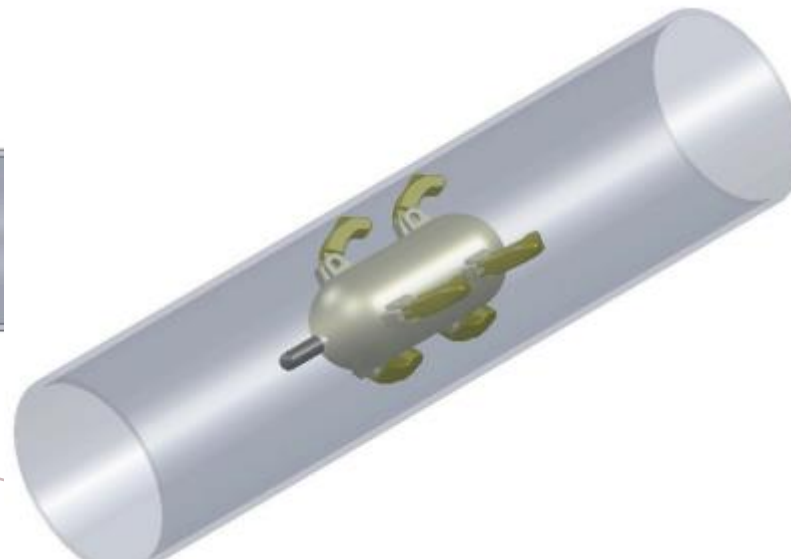
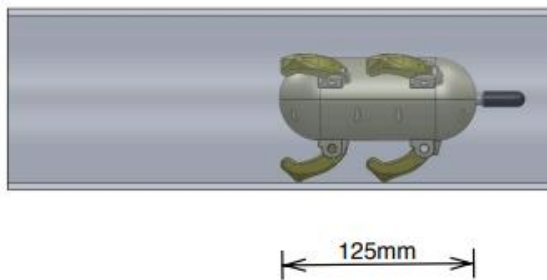
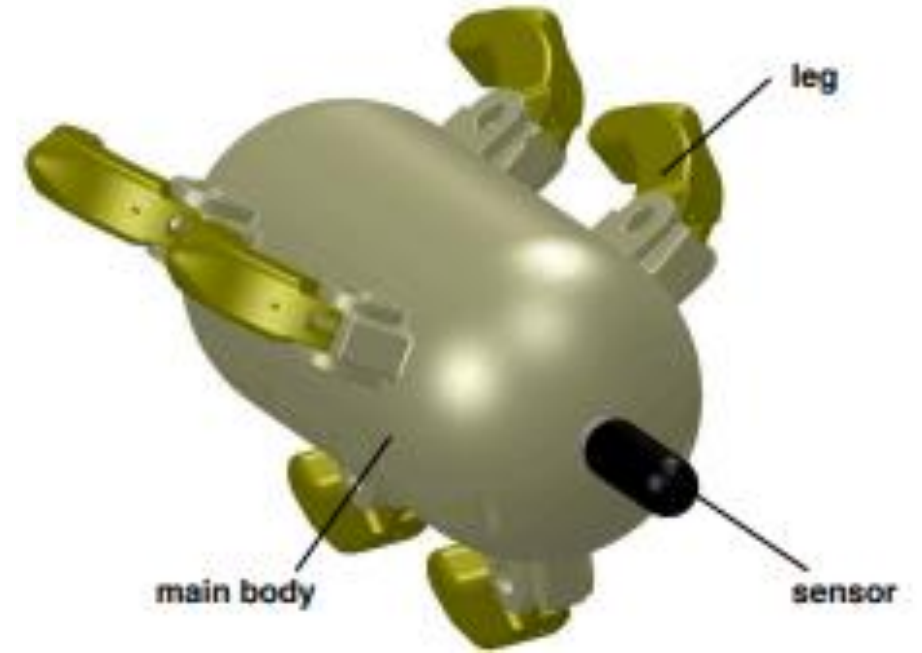
Joint failure (disconnection or gasket failure) on an asbestos cement pipe.

Solution A

Robot that Detects Small Leak

It operates under real pipeline conditions

It is made up of a series of modules



Solution B

Satellite-Based Leak Detection and Analysis

The system analyzes satellite images

The algorithm analyzes the data and delivers places where there are leaks



Solution C

Sonar Technology Tool

It uses sound waves

Leaks are identified by sound waves



Final choice of the system

Sonar tech tool



Suitable for all parts
of the world



Suitable for use in
all pipes,
regardless diameter
and material

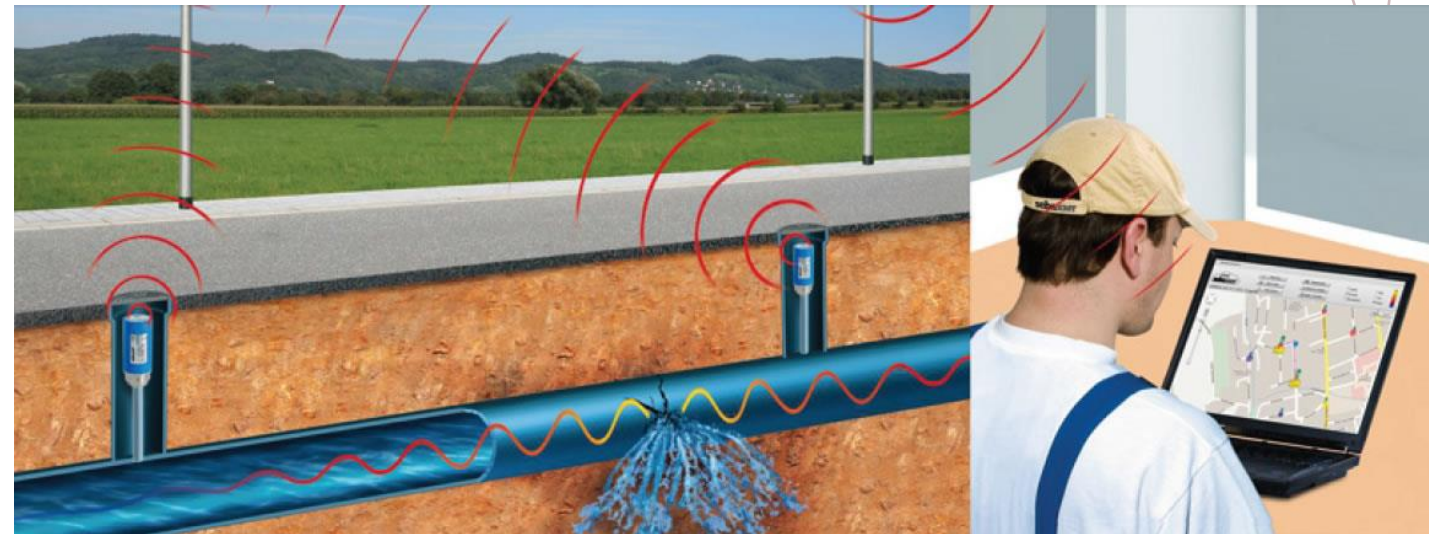


Conclusion

This system helps find leaks without moving large volumes of soil.

It is an environmentally friendly solution since it does not use fuel for its use

It is a versatile tool since it is small and easy to transport



THANK YOU FOR YOUR TIME

REFERENCES

1. "Causes, Effects and Solutions to Water Scarcity (Water Deficit) - Conserve Energy Future," Conserve Energy Future, <https://www.conserve-energy-future.com/causes-effects-solutions-of-water-scarcity.php>. (accessed May 03, 2023).
2. "The 2030 Agenda and the Sustainable Development Goals An opportunity for Latin America and the Caribbean Goals, Targets and Global Indicators." [Online]. Available: https://repositorio.cepal.org/bitstream/handle/11362/40156/S1801140_en.pdf?sequence=27&isAllowed=y (accessed May 03, 2023)
3. "Fast products overview," Fastgmbh.de, 2023. <https://www.fastgmbh.de/en/> (accessed Jul. 06, 2023).
4. S. LaBrecque, "Water loss: seven things you need to know about an invisible global problem," the Guardian, Mar. 02, 2015. <https://www.theguardian.com/sustainable-business/2015/mar/02/water-loss-eight-things-you-need-to-know-about-an-invisible-global-problem> (accessed May 09, 2023).
5. N. A. Barton, T. Farewell, S. Hallett and T. F. Acland, "Improving pipe failure predictions: Factors effecting pipe failure in drinking water networks.," Water research, 2019. (accessed May 09, 2023). [online]. Available: https://dspace.lib.cranfield.ac.uk/bitstream/handle/1826/14403/Improving_pipe_failure_predictions-2019.pdf;jsessionid=31B07C01EA17EAC0D16AB4715D6001C8?sequence=4
6. D. M. Chatzigeorgiou, K. Youcef-Toumi, A. E. Khalifa, and R. Ben-Mansour. Jan. 2011. "Analysis and Design of an In-Pipe System for Water Leak Detection,". [online] Available: <https://dspace.mit.edu/bitstream/handle/1721.1/107993/Analysis%20and%20design.pdf?sequence=1&isAllowed=y>
7. "Recover Satellite-Based Leak Detection and Analysis | ASTERRA," Asterra, Jan. 4, 2023. <https://asterra.io/solutions/recover%20/> (accessed July 6, 2023).
8. "Sonar technology tool to help conserve water," The University of Canterbury. <https://www.canterbury.ac.nz/news/2022/sonar-technology-tool-to-help-conserve-water.html> (accessed July 6, 2023).



Preventing Water Waste: Analysis of Leak Detection Systems for Underground Sanitation Networks

Universidad Tecnológica Nacional – Facultad Regional Paraná

Students of Civil Engineering

-Delfina Eichhorn

-Micaela Weber

English II - 2023

This work is an EFL student project. The pictures in this presentation are only used for educational purposes. If there is a copyright conflict, they will be immediately removed.