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Detection And Characterization of Buried Objects Using Seismic Reflection Technique

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EMBRACING OUR SMART WORLD WHERE THE CONTINENTS CONNECT:
ENHANCING THE GEOSPATIAL MATURITY OF SOCIETIES

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Presentation Outline

1. Brief Conclusion
2. Introduction
3. Methodology
4. Result
5. Conclusion



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Brief Conclusion

Seismic reflection technique is consider acceptable as an alternative technique for underground pipe detection

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Introduction



in Sisli, Istanbul

pipe



Land Slide – 2008
Bukit Antarabangsa
Malaysia

GROUND PENETRATING RADAR (GPR)

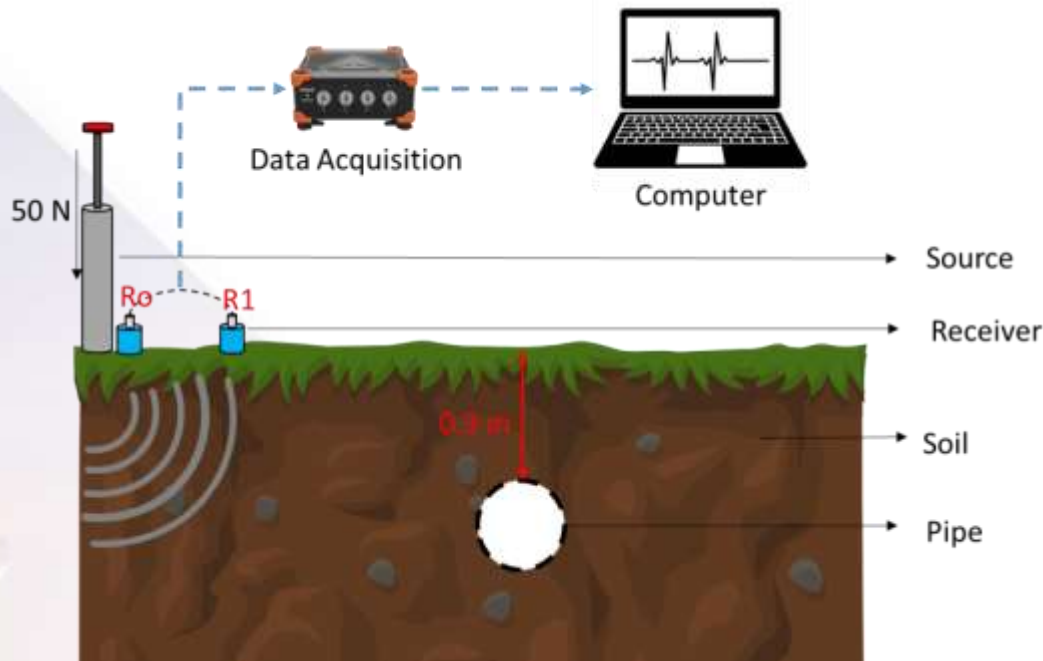


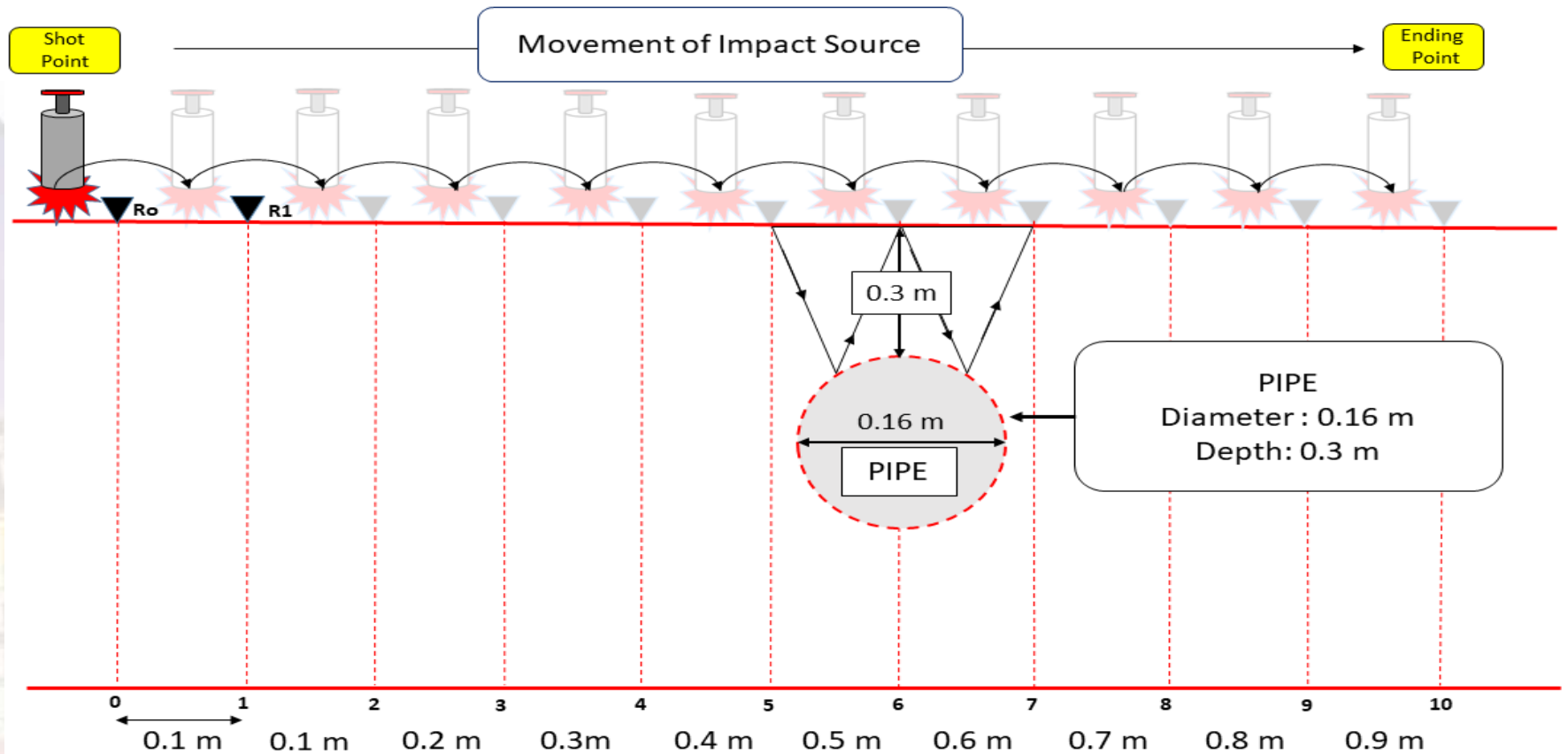
sensitive to

- Permittivity
- Conductivity
- Magnetivity

GPR has some limitations in detecting underground objects

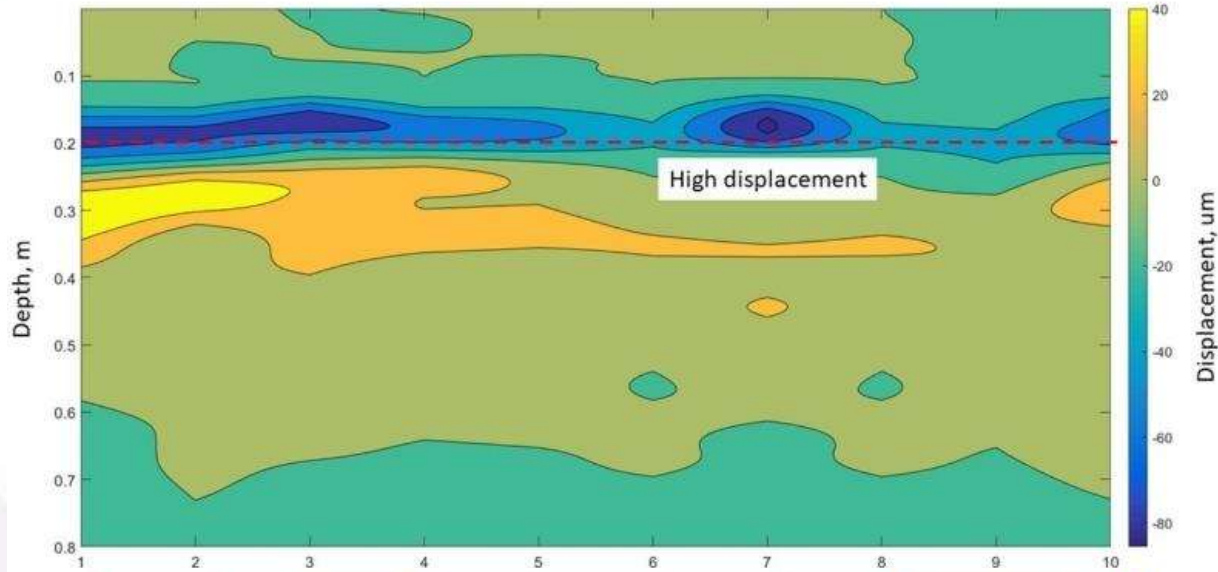
Methodology



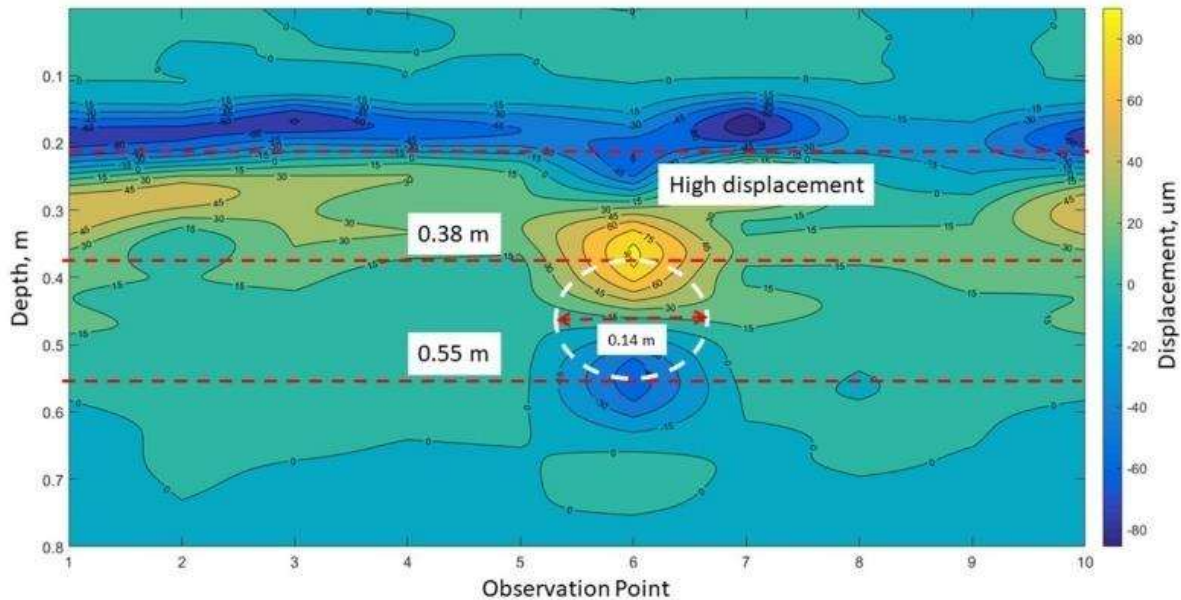


Result

Without Buried Pipe



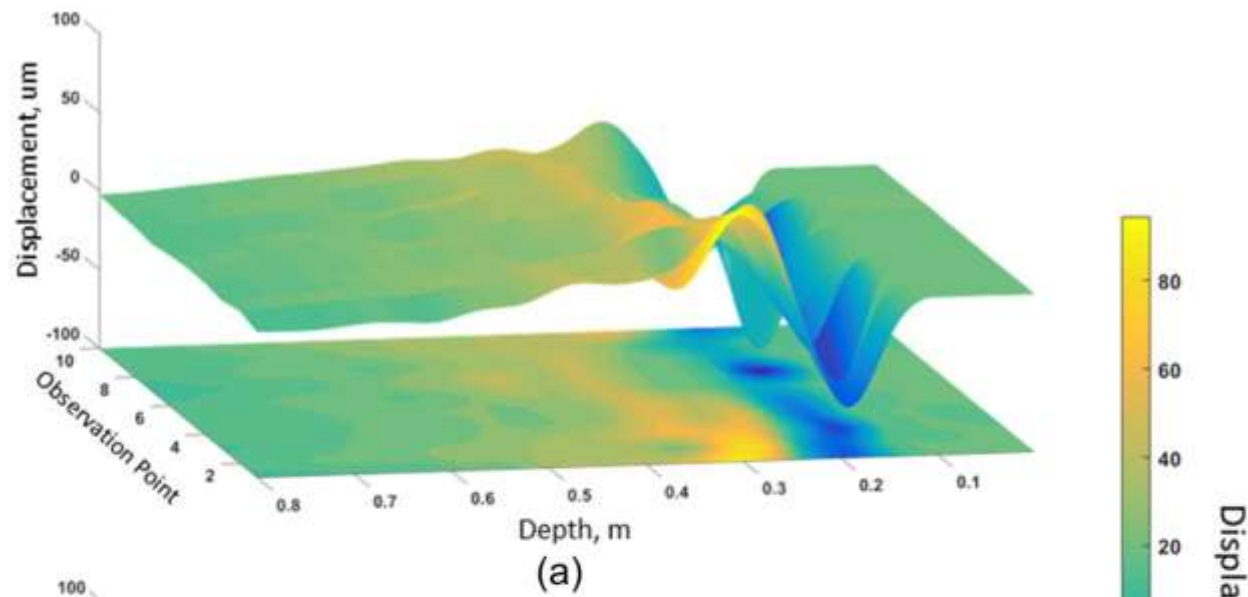
With Buried Pipe



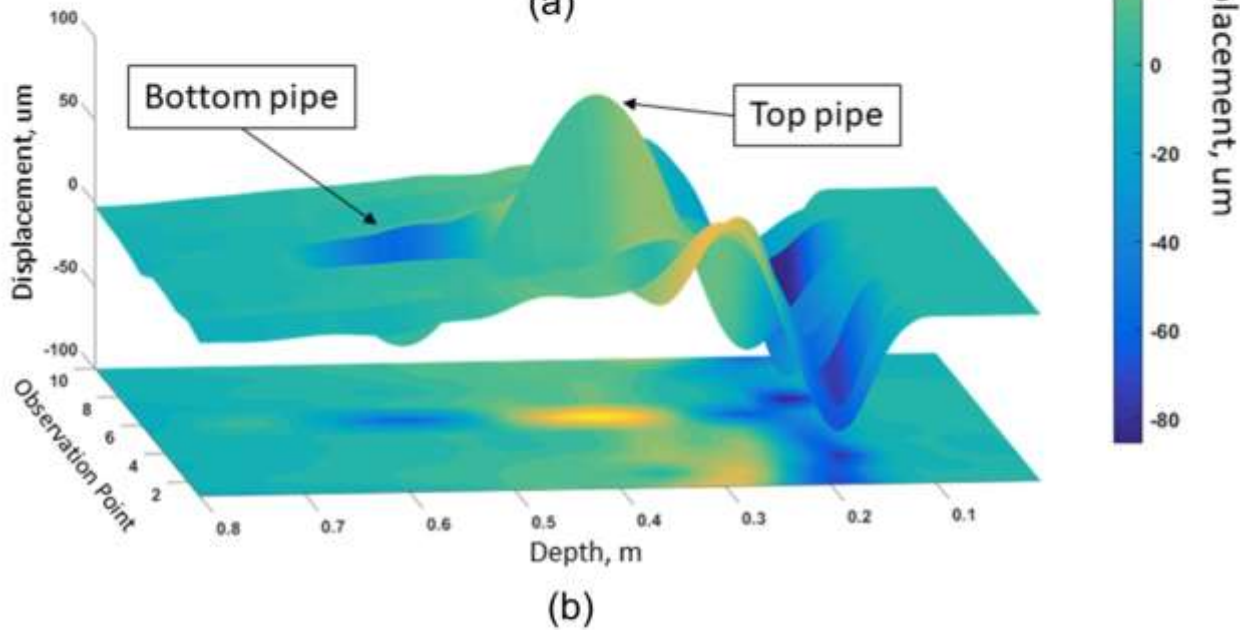
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Without Buried
Pipe



With Buried
Pipe



Conclusion

- seismic reflection technique is considered acceptable for the buried pipe detection and characterisation and can be used for underground pipe detection.
- Further studies are still needed for this technique/method to be used on detecting other types of underground utilities regardless of what they were made of, such as fiber optics and power cables.

$$Z = \rho \cdot V$$

Z = acoustic impedance

ρ is defined as the density

V is the acoustic velocity.

$$R = \frac{(Z_2 - Z_1)}{(Z_2 + Z_1)} = \frac{(\rho_2 V_2 - \rho_1 V_1)}{(\rho_2 V_2 + \rho_1 V_1)}$$

R = reflection coefficient of normal incidence

Dvorkin J., Gutierrez M. A., and Grana D., 2014, *Seismic reflections of rock properties*. Cambridge University Press.