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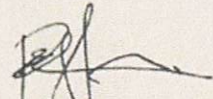
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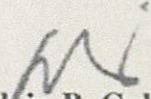
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# Analysis of Water Leaking Pipes using Impulse Radar: A Case Study in Surigao City, SDN Philippines

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### Abstract



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Document Sections

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- II. Methodology
- III. Results and Discussions
- IV. Conclusion

**Abstract:**Water distribution and transportation are carried out via subsurface plastic and metal pipelines. This study aims to determine the position of leaky pipes and discriminat... [View more](#)

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##### Abstract:

Water distribution and transportation are carried out via subsurface plastic and metal pipelines. This study aims to determine the position of leaky pipes and discriminate between metal and plastic pipes to pick appropriate handling tools during excavation. Leaking pipes in the water distribution facility were identified through visual inspection and limited information about the position and kind of pipe, where rigorous excavation with proper instruments caused substantial damage to the water pipes. Meanwhile, the approach employs impulse radar, in which signals are broadcast to subsurface pipes, and the reflected signals are gathered and analyzed using a radargram. The simulation is carried out by using soil radargram results as a base, which are then compared to the radargram results of metal pipe, plastic pipe, metal pipe with water, plastic pipe with water, metal pipe with leaking water, and plastic pipe with leaking water which is buried underground in the soil. When examined to the soil radargram, the results reveal dissimilarities of radargram depiction of metal pipe, plastic pipe, metal pipe with water, plastic pipe with water, metal pipe with leaking water, and plastic pipe with leaking water.

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### Contents

#### I. Introduction

An impulse radar is a geophysical technique that utilizes high-frequency radio waves for subsurface images. It provides a better image of the Earth's subsurface than any other geophysical method [1]. A radar system's ability to detect changes in the subsurface is dependent on the region's homogeneity. In addition, it can also respond to changes in the soil type and environmental conditions [2]. Below the radar is the land, which is inhomogeneous. Due to the varying soil types, it is possible to have isolated rocks or natural stratification [3].

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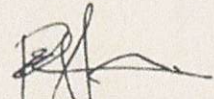
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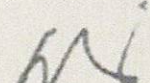
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### Abstract



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- II. Methodology
- III. Results and Discussions
- IV. Conclusion and Recommendation
- V. Recommendation

**Abstract:**This study develops a footstep generator and its viability to harvest energy in a two-shopping center in Surigao City. The footstep power harvester module was enclosed in... [View more](#)

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#### Abstract:

This study develops a footstep generator and its viability to harvest energy in a two-shopping center in Surigao City. The footstep power harvester module was enclosed in a wood-tile type 3x2ft size where parallel piezoelectric were embedded inside to increase the output current and placed strategically in the main entrance where people generally pass through. In this research, a microcontroller was used to regulate the dc from the piezoelectric to the 3.7-volt battery. The voltage sensor, like the current sensor, was used to Figure out how much voltage was contained in two AA batteries. Data collection of harvested energy was done using two establishments, 12hours from 6 am to 12 pm and 12 to 6 pm. The total average amount of harvested power on one 3x2ft size was equal to 668.5 mW. Tripling the footstep power harvester module would increase the power generated to 2W, enough to charge a mobile phone.

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**I. Introduction**

The human population has come to rely on electricity. Its influence is on the rise. The current innovation strives to generate electrical power from the ever-growing human population while minimizing environmental impact. The piezoelectric effect is the foundation of this technology. Some materials with the ability to accumulate an electrical charge are subjected to pressure and strain [1].

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