REMEDY TO LOCATE BURIED LDPE PIPE & MDPE GAS PIPES.

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ABSTRACT

PE pipes such as LDPE & MDPE are used in gas distribution industries, such as MGL. It is difficult to locate the pipe below earth surface when buried. Here in this project we focused on the detection of LDPE & MDPE which are buried in to the sub surface. Different process are shown in the project as Acoustic method, Ground penetrating radar, Electromagnetic conductivity (EM), Ultra-High Radio Frequencies, these all technics are complicated to locate PE pipes, for that purpose we give a different remedy using metal detector to locate buried pipes and the steps which we are including to detect the gas pipe. The research will be helpful to detect the buried gas pipes, result in saving life of people and we will be able to locate pipe even after 10 years and even also after losing of documents.

Keyword: - *Visual inspection, Acoustic devices, Electromagnetic (and radiofrequency) line locators, Infrared thermography.*

Various techniques have been developed to locate and map underground utilities and other manmade subsurface structures. Present utility mapping practices take two basic forms: active systems that must have some type of connection to the utility at some accessible point along its path, and passive systems that attempt to map utilities independent of any connection or even prior knowledge of their existence.

Active systems are problematic for various reasons, such as the difficulty and cost of physically accessing the utility and difficulty in sensing non-conductive utilities. Passive systems currently in use often employ GPR. GPR surveys are conducted from the surface, and the location and relative depth to potential utilities are determined from an analysis of reflected energy.

GPR, in general, is a very good sensor for utility mapping purposes, in that GPR is easy to use and provides excellent resolution. However, GPR has problems detecting utilities in certain soil types and conditions that limit GPR's use in many areas of the United States and the world, such as much of southwest United States (e.g., Arizona). Improvements in GPR sensor design can help overcome some aspects of these inherent limitations, but in many geographic areas, GPR should not be solely relied on due to imaging reliability and accuracy concerns.

Before trenching, boring, or otherwise engaging in invasive subsurface activity to install or access utilities, it is imperative to know the location of any existing utilities and/or obstructions in order to assist in trenching or boring operations and minimize safety risks. Currently, utilities that are installed or otherwise discovered during installation may have their corresponding physical locations manually recorded in order to facilitate future installations. One such system is referred to as the One-Call system, where an inquiry call can be made to obtain utility location information from an organization that manually records utility location information, when and if it is provided. However, the One-Call system is not particularly reliable, as only a certain percentage of the utilities are recorded, and those that are recorded may have suspect or imprecise location data. As such, currently-existing location data for buried utilities is incomplete and often questionable in terms of reliability.

There is a need in the utility installation and locating industries to increase the accuracy of buried utility/object detection. There exit a further need to collect, maintain, and disseminate 20 utility location data of increased accuracy. The present invention fulfills these and other needs, and provides additional advantages over the prior art.

1. Visual inspection

Traditional monitoring techniques for aboveground pipelines utilize image/video sensors to monitor the area around the pipelines. The image/video sensors have large sensing ranges if visibility is good. Any leakage or other abnormity status along the pipelines can be detected and localized by the image/video sensors. However, this technique cannot be used to monitor underground pipelines.

2. Acoustic devices

Small leakage from pipelines can generate high frequency oscillations in the pipe wall as the fluid escapes from the pipeline. The acoustic transducers are widely used to trace the vibration data to its source to detect and localize the leakage. Due to the limitation of the detection range, it is usually necessary to install a high density of acoustic sensors inside the pipeline to cover the whole pipeline network, which is impossible for underground pipelines due to the deployment and maintenance difficulties. Moreover, the acoustic sensors are insensitive to large leaks as they do not generate vibrations in the characteristic high frequencies. Therefore, the acoustic sensors are only suitable to accurately detect the small leakages on the underground pipelines near the checkpoints or pump stations.

3. Electromagnetic (and radiofrequency) line locators

The use of electromagnetic line locators, probably the most widely used method for the detection of buried utilities, can similarly be restricted by their inability to trace non-metallic objects. The technique does not locate metallic objects per se but requires a metallic medium to act as a conductor when introducing a signal into the utility line from an alternating current (AC) transmitter. The resulting magnetic field radiated by the buried utility is then detected by the antenna in the handheld receiver and interpreted to provide location and depth. Signals introduced into a utility line can be either indirectly or directly induced. Introducing a signal indirectly consists of generating and transmitting a magnetic field from a transmitter above ground. Alternatively, a signal can be introduced directly using an induction clamp, a circular clamp which induces a signal only in the particular conductor that it is clamped around. The best possible tracing signals are those which are generated using the direct connect method. By 21 virtue of the closed current loop, there is very little chance of the resulting signals being distorted. This is the preferred method of tracing a utility when and where possible (Twohig,1998). In addition to the above-mentioned 'active' mode, electromagnetic line locators can also be used in 'passive' mode by locating a background signal typically induced from buried power cables.

Although the main weakness of this method is its inability to trace non-metallic objects, this can be overcome by using an 'in-pipe transmitter' sonde or a trace wire. When access can be gained to a pipeline a flexible insulated trace wire can be fed into the conduit. The transmitter is connected to the trace wire and the signal in the wire can be traced as before. The need to insert a trace wire into the pipeline could be, at least partially, overcome if all new non-metallic pipes incorporated tracer wires (Vickridge and Leontidis, 1997). Alternatively, an 'in-pipe transmitter' sonde can be used in the same manner. Although there are other weaknesses to this method, for example extraneous readings can be produced in very complex or congested situations due to the presence of nearby utilities possessing strong magnetic fields (Fedde and Patterson, 1988), a major benefit is the fact that the results are unaffected by the properties of the material surrounding the utility, including the position of the water table.

4. Infrared thermography

The basic principle behind infrared thermography concerns energy transfer theory, which states that energy flows from warmer to cooler areas. The insulating effect of different types of materials slows down the flow of energy by a different amount and thus can be used to locate subsurface objects such as voids, boulders and pipelines. The sun fulfils the necessity to have an energy source by warming the ground to be tested. Conversely, if the test is performed at night, the ground becomes the heat source and the sky acts as the heat sink (Wirahadikusumah et al., 1998). An infrared scanner, sensitive to short- or medium-wave infrared radiation, is used to measure variations in temperature, which in turn are converted into thermographic images in which objects are represented by their thermal rather than their optical values. As with GPR, utility location using infrared thermography is affected by the properties of the surrounding ground, and in particular moisture content.

Similarly ground cover and wind speed have been known to influence results. The greatest drawback however is its inability to measure depth.

4. CONCLUSIONS

As the objective and goal of the project is to locate buried pipes using method to replace the tiles with a new types of tiles, helps to obtain the goals which reduces cost and time. Even if there is a maintenance cost, the project work according to the plan and there is high reduction of cost consumption and exact location finding ability.

5. REFERENCES

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