GPS and RFID Advanced Technology Program

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Various Field Issues

Miss Utility Marks

Miss Utility: notated duct bank
actual duct bank

Separation
GPS/RFID Pilot Program

- RFID will provide pertinent information to Utility Owners, Locators, Excavators, and Design Engineers.

- Assigns each programmable RFID tag with GPS coordinates for mapping and locating purposes.

- Compiles relocated or newly installed utility information for reference.

- RFID tags have proven to aid in the accuracy of utility locating in both vertical and horizontal aspects.

- Provides pertinent information to the Excavator for test pitting purposes that is normally unknown

*Does not supersede any Miss Utility Laws*
Protocol for RFID Marker Installation

Install RFID tags on relocated facilities:
- Every 25’ for metallic and non-metallic pipes.
- Every horizontal, vertical directional change, critical existing utility crossings, service connections, and abandoned facilities.

Install RFID on existing facilities during test pit operations.
Programmable RFID tags provide vital information about the facility (Owner, Type, Elevation, etc.).

During utility construction, the as-build information is provided to the Utility Owners on a monthly basis for progress reporting.

At the end of relocation efforts, a complete facility as-build can be provided to the Utility Owner in the requested format for record updates.
RFID Marker Installation Process

Step 1: Transfer template from the PC to the RFID locator

Step 2: Program Ball which transfers information from the locator to the RFID Marker

Step 3: Install RFID Marker above utility
Abandoned Facilities Verified
Overview of Benefits

Enhances damage prevention and public safety throughout the Commonwealth of Virginia.
Conveys the knowledge obtained from the VDOT design and field operations to the Utility Owners.
Enables utility companies to work together.
RFID tags become the backbone of the GPS system and provides specific information for future use by the Contractors, Locators and Designers.
Creates a linear GPS segment that can be used to establish the zone of protection for the specific utility when construction equipment is outfitted with GPS enabled digging trigger mechanisms
Does the use of the advanced technologies increase the accuracy of the underground utility locates?
Yes

RFID TEE
Mapping Solutions utilizing GPS and RFID technologies

Shea Ridings
On-Time Utility Solutions
Marker ID + GPS Coordinates → GPS running Trac-ID Software → Data Collected in NUAG prescribed format → Data Synchronization with Exor Spatial Database → Hosted, shared data.
RFID depicted on VDOT Construction Plans
RFID: pop-up informational tags active in PDF files.
New Initiatives

Install programmable RFID tags during the preliminary engineering stage of the project when the existing utilities are designated as part of the beginning phase of the best value plan concept.

VUPS, GTI, and VDOT are involved in an initiative to provide the RFID information to the locating community.

Consideration is being made to implement this system into the Land Use Permit acquisition requirements.
Cost Analysis
Rt.29/Gallows Rd. Project

Possibilities with RFID Program
Total Utility Investment – $15M
Cost = $10,000
Costs includes:
  • Materials
  • Programming
  • Installation

Possibilities without RFID Program
Damage
Repair of facility
Contractor down time
Delay to traveling public
Fire/Rescue/Police response
Lost revenue for property owner
Lost revenue for utility company

The average cost to install a 24” water main is approximately $145.00 per linear foot.

The cost to install RFID tags at a rate of 4 marker balls per hundred linear feet of pipe as previously specified increases the cost per linear foot by $0.60.
Questions???

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Damage Prevention Research at GTI

> Alicia Farag, GTI
> Virginia DPC
> April 26th 2011
Project Overview

> Intelligent Utility System
> GPS Based Excavation Encroachment Notification
> Acoustic Plastic Pipe Locator
> VDOT Marker Ball Program
Intelligent Utility System

> Smart phones and tablets devices for field data collection for compliance
  – CP readings
  – Marker ball and RFID tag installations
  – HCA surveys

> Applications for Android and iPad/iPhone

> Incorporating supporting technologies
  – Touch screen, GPS, cameras, Bluetooth, RFID

> Leveraging cloud computing for temporary data storage

> Direct GIS integration methodology
GPS Based Excavation Encroachment Notification

> Phase 3A – GPS tracks excavation activity and creates a notification if digging is occurring outside of a valid one call ticket

> Phase 3B – GPS tracks bucket location and creates a notification if digging is occurring near a utility line

> New pilot project in New York and maybe Texas
Acoustic Plastic Pipe Locator

> Locates small diameter plastic pipe up to five feet deep

> Tested in various soil conditions

> Commercial agreement with Sensit Technologies
VDOT Marker Ball Program

> Other states interested in implementing similar programs

> Marker ball process is being incorporated into other research initiatives
  – Transportation Research Board project to develop a process to prevent excavation damage on DOT projects that result from inaccurate and outdated maps
Thank You!

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