

## Comprehensive System to Prevent Damage to your Buried Utilities During/After Construction


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- Have your badge scanned at the door
- Attend 90% of this presentation
- Fill out the online evaluation for this session



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*“Protect people and the environment by advancing the safe transportation of energy and other hazardous materials that are essential to our daily lives.”*  
– PHMSA Mission Statement

Over the 20-year period analyzed by the U.S. Department of Transportation's Pipeline and Hazardous Materials Safety Administration (PHMSA)

- 1993 to 2012
- 1,630 third-party excavation damage incidents to gas pipelines (only)
- resulting in 141 fatalities
- 440 injuries
- over \$369M in property damage.

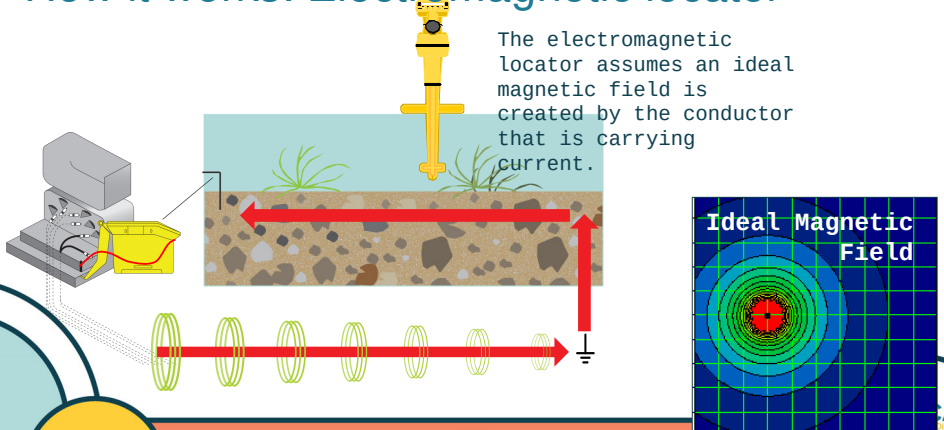
PHMSA Report to Congress on Improving Damage Prevention Technology. August 3rd, 2017. <https://www.phmsa.dot.gov/news/report-congress-improving-damage-prevention-technology>

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## How it works: Electromagnetic locator

The electromagnetic locator assumes an ideal magnetic field is created by the conductor that is carrying current.



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## Root Cause of Utility Line strikes....

You as a Facility Owner can do everything correct and still get hit

Excavator did not call the one call center, includes occasions when notification was not required.

### ✓ Locating Practices or Location Not Sufficient (32%)

• Example: Locator marked the work zone but missed service. Locator misread ticket and did not locate the entire dig zone. Facility was outside the tolerance zone.

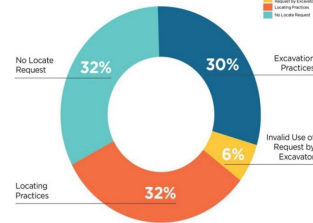
### ✓ Excavation Practices (30%)

• Excavator did not use proper care or follow correct procedures when excavating near a facility.

### ✓ No Notification/Locate Request 32%

- Call 811
- Local call center
- permit

Reported Damages by Root Cause Group

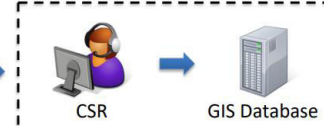
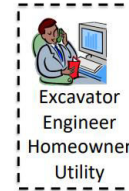


CGA Dirt Report 2023



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## 811 Call Center



3 Major Categories/Root Cause.

1. Locating Practices 32%
2. Excavators 30%
3. No Notification 32%

Sends Ticket



I cannot fix stupid even with a wrench

- Process takes 48-72 hours – or longer
- Process has fundamentally not changed in 30+ years

Total 94%



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PHMSA Report addresses this threat to pipeline and public safety through nine strategic initiatives:

- Enhanced Communication between Operators and Excavators
- Fostering Support and Partnership of all Stakeholders
- Operator's Use of Performance Measures for Locators
- Partnership in Employee Training
- Partnership in Public Education
- Enforcement Agencies' Role to Help Resolve Issues
- Fair and Consistent Enforcement of the Law
- **Use of Technology to Improve the Locating Process**
- Data Analysis to Continually Improve Program Effectiveness

**Existing Location Practices and Traditional Marking Products**

**811 REQUIRE EXCAVATION CREW COMPLIANCE AND PROACTIVITY**

**Remote Monitoring and Sensor Systems:**

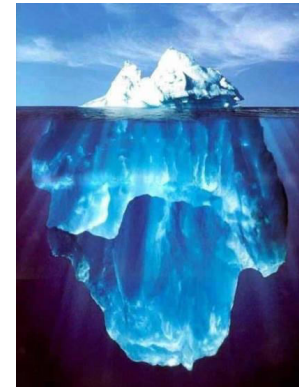
**DO NOT DIRECTLY ALERT EXCAVATOR OPERATOR**

PHMSA Report to Congress on Improving Damage Prevention Technology, August 3rd, 2017.  
<https://www.phmsa.dot.gov/news/report-congress-improving-damage-prevention-technology>  
 Pipeline Inspection, Protection, Enforcement and Safety Act of 2006.  
<https://www.phmsa.dot.gov/sites/phmsa.dot.gov/files/docs/technical-resources/pipeline/gas-distribution-integrity-management/61781/pipesact2006.pdf>



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## Cost of Underground Utility Line Strike

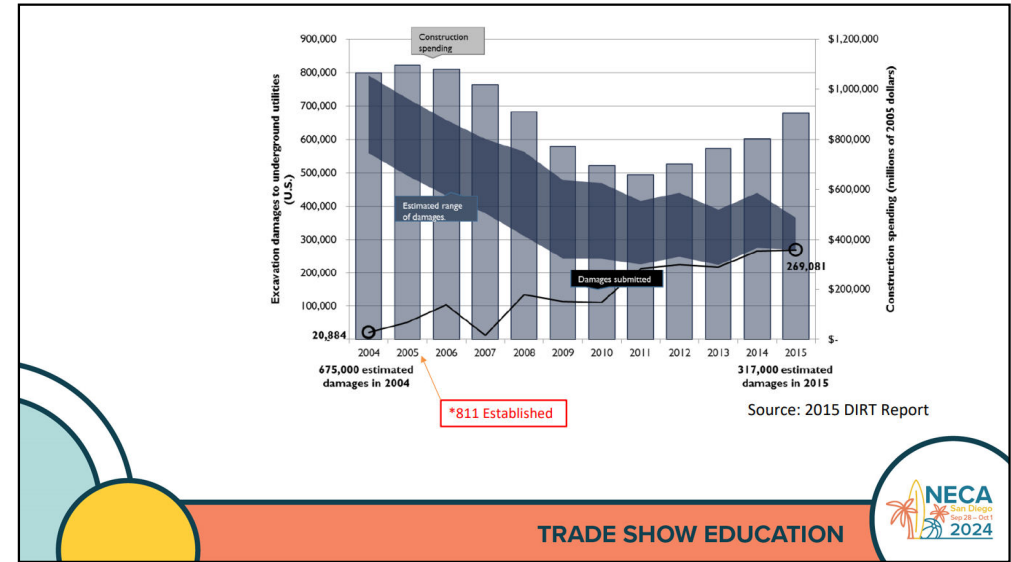
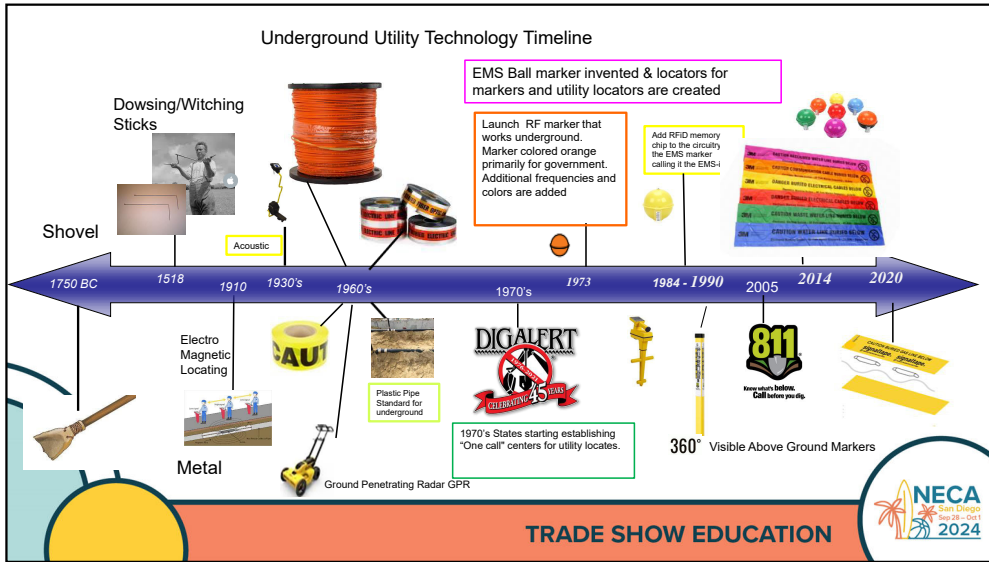


### Repair Cos Down Time Consequential Costs

- ✓ Death/Injuries
- ✓ Property Damages
- ✓ Emergency Services
- ✓ Repair Cost
- ✓ Lost Time
- ✓ Lost Material
- ✓ Lost Sales
- ✓ Lost Taxes
- ✓ Lost Production
- ✓ Machinery Damages
- ✓ Secondary Emergency
- ✓ Spoilage
- ✓ Legal Cost



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### Tracer Wire

Standard solution: mark path of plastic pipe

For Trace Wire to work:

- Must be installed properly
- No corrosion, splices or nicks in jacket
- No Potential for bleed-off
- Access points must not be damaged or missing
- No exposure to Lightning or potential unwanted conductivity on wires
- Need Hi Tensile in strength for HDD use

Requires Conductivity

Corrosion

Broken

Improperly Installed (Stops at Fence)

Compliance

Unprotected & Exposed to Elements

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Figure 1: LEFT: Illustration of tracer-wire loss of continuity due to a tracer wire cut or corrosion  
RIGHT: Illustration of RF locators continuous signal without underground continuity

Figure 2: LEFT: Illustration of tracer wire signal bleed-off in a congested area  
RIGHT: Unique RF locator frequencies - No signal bleed-off

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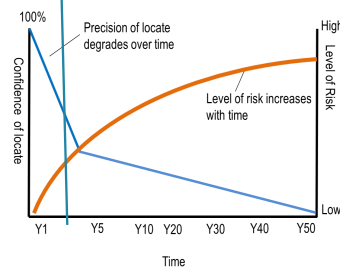
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# Trace Wire has a shelf life of 4 years.

Some lasts 40 seconds and some last 40 years.

Subdivision – Site turn over.



### Risk Accelerators

- 3<sup>rd</sup> party damage
- Cut or corroded tracer wire
- Soil characteristics
- Poor or no installation



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# RFID Marker Technology

The collage shows various components of RFID marker technology. It includes a red 'Coil Antenna', an orange 'Disk Housing', a set of 'Color Code by Utility' balls in green, blue, red, yellow, and orange, an 'ID MARKER' circuit board with an 'A.S.I.C' chip, and a 'Disk inside Ball Housing'.



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# Electronic Marking System (EMS)

### How does a Marker work?

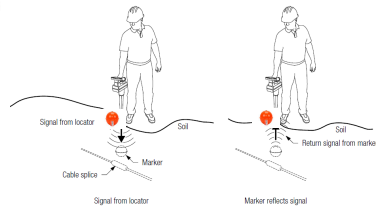
- Receiver (Locator) sends a utility specific frequency to a buried Marker that energizes a tuned resonant transponder. The Receiver provides power source to Marker.
- Receiver reads RFID data off Marker.

How does the locator know what frequency to send?

- The technician using the locator selects the frequency of marker/utility they are looking for.
- Ex. A Tele (Orange) Marker Ball is buried at a splice, so the technician would tell the locator to emit the 101.4 kHz frequency. Marker would power up and talk mirror/talk to locator.

### Uniform Color Code

- Proposed excavation
- Temporary survey markings
- Electric power lines, cables, conduits and lightning cables
- Gas, oil, steam, petroleum or general services
- Communications lines or signal lines, cables or conduits
- Fire hydrants
- Reclaimed water, irrigation and dairy lines
- Sewer and drain lines



Application	Color	Frequency
Telephone	Orange	101.4 kHz
Power	Red	169.8 kHz
Water	Blue	145.7 kHz
Wastewater	Green	121.6 kHz
GAS	Yellow	83.0 kHz
CATV	Black	77.0 kHz
General Purpose/Reclaimed Water	Purple	69.35 kHz

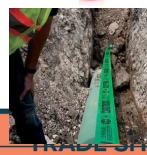


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# Current Industry Practice



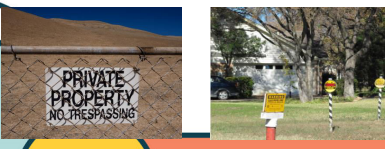
### UG Marking



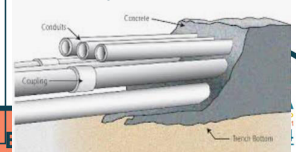
### GPS Mapping



### Surface Visual and Physical Marking

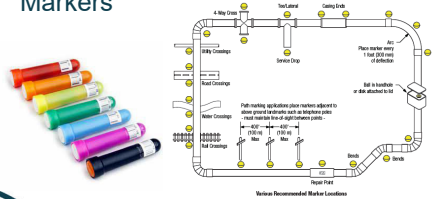


### UG Physical Protection



# 3M Electronic Marking System (EMS) – Point, Path & Early Warning Detection

**Point Marking:** Identify critical underground points in your system – “Markers”



**Path Marking & Early Warning Detection:** Locate path of selected utility from point A to point B.

Continuous path.  
Alert excavators of your assets.

Note: Path Marking will not locate Points of Interest.

Applications:

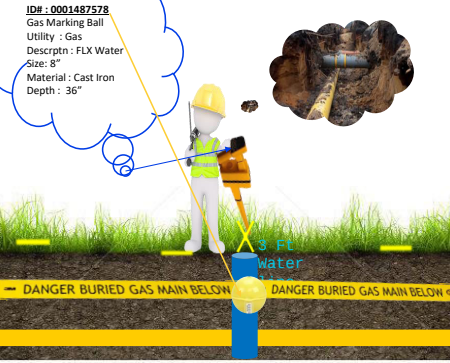
1. Rope: HDD
2. Tape: Open Trench/Open Cut



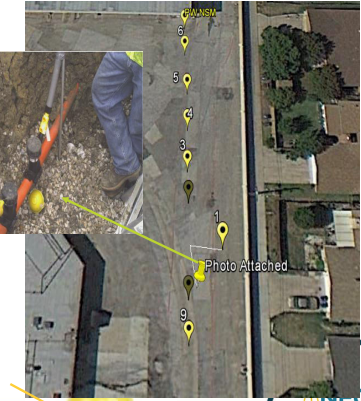
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EMS Portfolio with its robust design will perform in rugged/congested environments & provides the agility to keep your as builds and maps up to date and accurate

POINT OF INTEREST



Each RFID Marker has a unique serial number - This serial number is the tracking mechanism for the markers thru out your Mapping System.



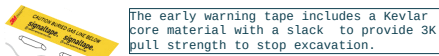
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# By installing Early Warning Tape 2-3' above Utility

You increase your protection for your Utility and your Contractor from:

- > No Notification
- > Facility Marking or Location Not Sufficient
- > Excavation Practices Not Sufficient

Path Marking



Install early warning tape 2- 3 feet above Utility



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