Effective Utility Encasement Criteria and Methods

A research to identify encasement specification to enhance efficiency, prevent environmental disasters and sustain system performance.

WHAT IS THE NEED?

Utility related dig-in accidents result in jeopardizing safety, huge repair costs, highway operation disruptions and environmental hazards. Data from the Pipeline and Hazardous Materials Safety Administration (PHMSA) show that pipeline incidents have been significant in the past 20 years for federal and state-regulated natural gas pipelines, hazardous liquid pipelines, and liquefied natural gas (LNG) plants. California has seen several pipeline incidents over the last several years with an average total cost of several millions dollars each year.

Often, incidents occur due to lack of information on risks associated with subsurface utilities, particularly for uncased facilities, within highway right-of-way. Although Caltrans allows utilities regulated by California Public Utilities Commission (CPUC) and private utilities to be installed, there are few unified literatures about risk evaluations associated with uncased versus encased utilities; and some isolated recommendations on encasement specifications for protecting the utility facilities. Preliminary reviews of literature indicated that we have insufficient guidance on encasement design for pipeline utility protection across states.

As a result, the research team will analyse and identify the most effective encasement methods, standards and specifications for each kind of utility.

WHAT ARE WE DOING?

The purpose of the research titled ‘Effective Utility Encasement Criteria and Methods’ is to identify ideas, make recommendations and document various design specifications for encased and uncased facilities. The team will review utility protection related materials, articles and reports for regulations and policies on underground utility encasement.
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The research is broken down into 7 tasks:

Task 1: Investigate, Analyze and Document Pipeline Dig-in Accidents with regard to Encasement Needs
Task 2: Investigate and Document Encasement Standards for Pipeline Safety
Task 3: Evaluate Soil Characteristics for Pipeline Leakages
Task 4: Develop Risk Analysis Tool for Encased and Uncased Utilities
Task 5: Evaluate Trenchless Technologies for Underground Pipeline Replacement
Task 6: Evaluate Encasement Requirements for Subsurface Utility Installations
Task 7: Conduct Workshop/Present Research Findings

The research team will document parameters and specifications that are provided by the federal regulations for pipeline protection and safety with encasement and compare their applications with examples from various states that are included in the Preliminary Investigation done by Division of Research, Innovation and System Information (DRISI) and Caltrans. The states included in the investigation are Missouri, Alabama, Iowa, Virginia, Texas, Washington, Michigan, New Hampshire, Oregon and Massachusetts.

WHAT IS OUR GOAL?
The intention is to create a spreadsheet tool for any users involved in frequent excavation exercises of utility pipelines both on and off the State highway system. Various strategies for leak detection, trenchless technologies and encasement design specifications identified in the research will be displayed in an easy-to-follow table used amongst Caltrans members.

WHAT IS THE BENEFIT?
The research will provide useful guidelines that help Caltrans contractors and utility-work related staff managers in minimizing dig-in accidents and making more informed decisions at a utility excavation site.

WHAT IS THE PROGRESS TO DATE?
The research work is in progress. Task completion date is May 15, 2019.