Subsurface Mapping - A Trenchless Technology Perspective

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A Presentation by
Dr. Niranjan Swarup
Hon. Director (Higher Education)
Construction Industry Development Council
&
Director General
Indian Society for Trenchless Technology
Road cave-in reports on record high in city

Old roads, new roads, it appears that all roads in the Capital are on the verge of collapse. Even the ones that have been laid ahead of the Commonwealth Games have begun giving trouble: Several roads near the Games venues have already started showing rot, raising serious questions about the quality of work being carried out. HT reports. Costly carelessness

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HT Correspondents
Hindustan Times

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Ringing the alarm bell, the Delhi Traffic Police have said this is the first time that so many
Utility System Failure
Case 1 - Multiple Road Cave-ins Prior to 2010 Commonwealth Games in New Delhi

- New installation work on large scale was carried out without any prior buried utility mapping in Delhi.

- Following monsoon season saw several road cave-in incidents in Delhi NCR.

- PWD Delhi, engineers initially blamed use of Trenchless Technology for those collapses. While, inappropriate use of technology was the main reason behind those collapses.

- Under Delhi PWD assignment, INDSTT developed the Standard Operating Procedures for use of Trenchless Technology on PWD Delhi Roads.
Case 2 - UFW & NRW, Kerala Water Authority (KWA)

- KWA in 2012-13, conduct a pilot survey of water mains in the city using a hi-tech pipeline inspection system.

- The insides of the pipes were found to be heavily tuberculated, which has reduced their internal diameter and consequently brought down their carrying capacity by 40%.

- An official statistics show that out of the 300 million litres a day (MLD) of drinking water sent to the pipelines in the city, only 150 MLD is accounted for.

- ALL national ULBs are facing the similar situation in their respective regions.
Trenchless Technology

A set of techniques for the remote installation, rehabilitation and repair of utilities, pipelines and small tunnels -- linked by their lack of need for digging a continuous trench for the installation of new pipes or the repair of old pipes.
What will serve our Purpose?

Just A MAP?

OR

MAP With Attributes?
Public Infrastructure
TYPES OF UTILITY

In locations where crossings may be required beneath roads the following utilities may be found:

- Sanitary sewers
- Surface water/storm drains
- Combined sewers
- Water mains
- Gas mains
- Gas Distribution pipelines
- Industrial pipelines
- Oil transmission pipelines
- Electricity cables
- Telephone cables
- Cable TV cables
- Street lighting cables
- Traffic light cables
- Other data / information technology cables
- Other unexpected utilities or historic structures.
Standard Operating Procedures for Application of Trenchless Technology in Developing and Maintaining Subsurface Utility Networks Under PWD Roads in New Delhi

Indian Society For Trenchless Technology
908, Hemkunt Chamber
89, Nehru Place
New Delhi - 110019

Standard Operating Procedure Manual for Trenchless Technology
2nd Edition
Dr. Niranjan Swarup

Indian Society for Trenchless Technology
Standard Operating Procedure
Stipulations Linked with Mapping

1. Introduction
2. Importance
3. Utility Classification
4. Location Timing
5. Scope of Coverage
6. Responsibility of Location
7. Sharing of Background Information
8. Liaising Assistance
9. Investigation Procedure
10. Data Management
Data Management

- Right-of-way owner needs to assume the responsibility of developing, managing and owning the subsurface utility data base.
- For new structures, as-built drawings and data must be collected from the implementing agencies after proper verification.
- For existing structures, the use of correct mapping techniques and methods is essential to generate reasonable and correct subsurface interpretations.
- Professionals engaged in this data generation and interpretation must be adequately skilled in Subsurface Utility Engineering.
Future of Subsurface Structures

Discussion Paper for Developing Code of Practice for Subsurface Utility Engineering Suiting Indian Conditions

- Indian Society for Trenchless Technology (INDSTT) in its recently concluded No Dig India Show 2017 has released a discussion paper for developing Code of Practice for Subsurface Utility Engineering Suiting Indian Conditions.

- Discussion paper is open for the expert comments and interested contributor may contact for the copy of the paper.

- Final COP for SUE is schedule to be released in forthcoming No Dig India Show 2018 at Mumbai.
METHODS

- Pipe and Cable Location
- Ground penetrating radar (GPR)
- Terrain Conductivity
- Resistivity
- Metal Detection
- Magnetic
- Acoustic
- Thermal/Infrared
- Gravity
- Seismic
Principle of GPR
Operator Skills
Concluding Remarks

- Buried Utilities pose great challenges as these are out of sight so are out of mind and we see them only when a failure has occurred.

- With each new utility buried, rehabilitated or replaced, the complexity grows and we need to wakeup to the requirement immediately.

- Trenchless is the solution of many of such challenges, provided all subsurface data is up to date & interpretations are geologically and valid in three dimensions.

- We are Vigorously Pursuing standardization in subsurface mapping by laying specifications, competency standards, and operating procedures and invite stakeholders to join us in this important capacity building initiative.

- Associations with this initiative could be through society membership, participation in the task forces, contribution of technical inputs, vetting and commenting on the draft documents and proposals.
Thanks for your attention

Construction Industry Development Council
Indian Society for Trenchless Technology
Hemkunt Chambers, 89, Nehru Place,
New Delhi - 110019
Web: www.cidc.in /www.indstt.com
Mail: cidc@cidc.in /indstt@indstt.com