Underground Infrastructure: Planning, Development and Revitalization

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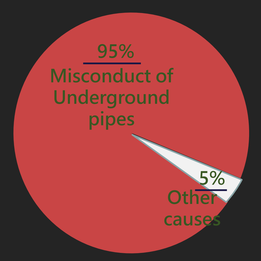
Abstract

▪ The challenges facing Liuzhou's underground infrastructure system today are unlike any it has ever faced before. Frequent underground gas pipeline leaks and explosions are impacting the safety and quality of citizens' lives. To develop a safe, efficient and economical underground infrastructure system, Liuzhou City will have to do three things: (1) create a unified administrative department for underground pipeline administration, (2) conduct a citywide underground pipeline survey by stages and create an information platform to share the underground pipeline data, and (3) develop a public-private partnership to construct a utility tunnel. The poster outlines these critical steps in Liuzhou's underground infrastructure system reform and renewal.

Background

▪ According to the statistics of Liuzhou Safety Bureau official report, there are 366 hidden safety problems of underground gas& oil pipelines until the middle of 2015, and most of them are due to the misconduct of other underground pipes.

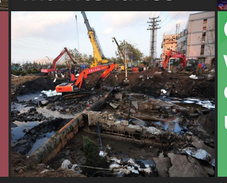


(Source: Liuzhou Safety Bureau official safety report, June, 2015)

Challenges

Frequent road excavations caused by underground pipeline maintenance

An unsafe underground pipeline system



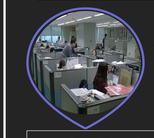
Challenges with acceleration of city urbanization

Issue 1

▪ Urban underground pipelines laying with few coordination and are short of unitary management guidance.

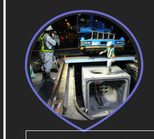
Liuzhou's underground pipelines are divided into six categories functionally, they are water service, drain, gas, power, telecom and industry, etc. and they belongs to corresponding departments or companies, which are not directed by a unitary organization. Usually, they just do their own planning and construction separately without clearly understanding those of other pipelines system' arrangement. This has brought so many conflicts and risks.

Causes



The deficient institution setting of underground pipeline administrative system.

All kinds of pipelines below the city like an "organism", because they are interdependent and closely relate with each other. Similarly, an administrative system would function well only if it could have an organic institution setting, too. While, Liuzhou's underground pipelines industry are managed by different entities rather than a unified department, which has led to the underground pipeline projects are implemented without reasonable planning, coordination and supervision.



The shortage of advanced construction theories and scientific underground pipeline laying techniques.

New theories and techniques are extreme urgently needed to be introduced to Liuzhou underground pipeline industry, and this is supposed to be the most effective way to deal with these challenges mentioned above.

Issues

Issue 2

▪ The underground data that are needed in planning and approval are deficient, and supervision is weak.

The Planning Bureau always cannot do an exact planning and approval jobs about the underground infrastructure, because they couldn't have a complete and accurate underground pipelines' data. In contrast, those different kinds of underground data are controlled by different departments and companies above or are lost. Besides, supervision on the underground pipelines construction is inadequate, especially in the completion stage.

Issue 3

▪ The underground laying technique is defective and maintenance is difficult to implement.

Nowadays, the technique of Liuzhou underground pipeline construction is too old to meet the needs of urban underground infrastructure development. Mostly, workers have to dig up roads again and again to conduct underground pipeline construction or maintenance, which is inefficient, waste of resource and is harmful to environment.

The underground pipeline network data is incomplete and short of information sharing.

Until now, Liuzhou still haven't conducted a comprehensive underground pipeline survey, which is aiming at figuring out the most realistic condition of underground system, thus the data of Liuzhou underground pipeline is defective and imperfect. Additionally, the underground practitioner didn't have an information platform to share data with each other.

Recommendations

Step1 Reorganize the institution setting of Liuzhou underground pipeline administration, found a unified administrative department..

Reorganize the institution setting of Liuzhou underground pipeline administration, found a unified administrative department. Under this institution setting, the new comprehensive department can make a coordinated laying plan through combing with demands of each underground pipeline. At the same time, this department can conduct a severe inspection and evaluation during the process of underground pipeline construction.

Step2 Conduct a city underground pipeline survey by stages and create an information platform to share the underground pipeline data.

After step1, a city underground pipeline survey could be conducted predominantly by the department step by step. This survey aim at completing Liuzhou underground pipeline data. We can choose one district of Liuzhou to get start and cooperate with those pipeline companies involved, because the survey would need huge capital input and a long time, but it is significant for all of us. Next, the data collected by this survey will contribute to build an underground pipeline information sharing platform which is available for these companies as a reward.

Step3 Introduce the utility tunnel with related legislation and PPP mode.

Through applying utility tunnel, a modern and intensive urban underground infrastructure could be formed. It laid various underground pipelines in the same tunnel for centralized management, which could save the land resources, decrease environmental damages and it is convenient for maintenance. While, this project should be conducted by stages, too, and can begin at these areas of high-volume rate or new developing. At the same time, it should be government directive. On one hand, the corresponding legislation should be conducted to regulate the new model underground infrastructure's property-rights as well as the responsibilities of every entities involved; On the other hand, PPP mode will be used to deal with the financing problems of utility tunnel construction.