

Rehabilitation of Underground Water and Sewer Lines

The Costs Beyond the Bid

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Abstract

America's towns and cities are facing the challenge of either replacing or rehabilitating thousands of miles of underground water and sewer pipes. The Water Infrastructure Network (WIN), a coalition of lawmakers, water providers, health officials, engineers and environmentalists, estimates that anywhere from \$250 billion to \$1 trillion will be needed to fix or replace America's crumbling wastewater and drinking water pipes over the next 20 years. When evaluating methods of rehabilitating this failing infrastructure decision makers are recognizing that there are costs beyond the bid that must be seriously considered.

Introduction

The conventional method for replacement and repair of wastewater and sewer pipelines has been open cut, or dig and replace. Although it may seem that the open cut rehabilitation method is the best alternative because there is a new, factory manufactured pipe, many municipal officials have found this to be a time-consuming, expensive process that can cause a wide-range of disruptions in their communities. In recent years, however, community leaders have found the need to further analyze their choices to determine the far-reaching impact of these projects.

Objective

Public officials must be able to look beyond the bid and contemplate who and what will be impacted by a project, taking into account that costs go beyond the actual physical completion of the project. They must recognize the need to reduce the significant and lasting impact caused by the replacing of damaged and/or deteriorating underground sewer lines on the quality of life of the entire community.



Measurements

1. IMPACT ON THE COMMUNITY RELATED TO ROAD AND TRAFFIC DISRUPTION

- a. Time duration of the project Conventional replacement can takes weeks to complete compared to a trenchless application can take only days.
- b. Traffic disruption A recently released study by the Texas Transportation Institute concluded that in 1999 the average person spent 36 hours a year sitting in traffic. Lane blockages due to open cut construction add to this traffic disruption.
- c. Cost of fuel Traffic congestion, according to the previously mentioned study, accounts for 6.8 billion gallons of fuel consumption and 4.5 billion hours of travel time, costing the nation \$78 billion dollars.
- d. Cost of travel time
- e. Road damage Excavations contribute to the decrease in pavement life expectancy.
- f. Vehicular wear Average vehicle maintenance can increase as much as 50% by driving through detours because of increased wear on shocks, tires, brakes and clutches.
- g. Supporting systems and adjacent structures The possibility of damaging other buried utilities is a major problem faced during replacement and repair projects.
- h. Loss of revenue and sales tax Traditional open-cut construction methods create inconveniences for local businesses, increasing the natural tendency of people to avoid obstructed areas.

2.COST OF ACCIDENTS, CAVE-INS AND OTHER OCCUPATIONAL HAZARDS

For the period 1999-2000, the U.S. Occupational Safety and Health Administration (OSHA) rates water, sewer and pipeline construction, essentially open-cut work, as the fourth most deadly occupation in the United States (2001 OSHA Industry Profile). There are an average of 55 deaths/year related to cave-ins in the United States.

3.HEALTH CONSIDERATIONS

a. *Air Quality*

OSHA notes that the over one million workers exposed to diesel exhaust face the risk of adverse health effects ranging from headaches and nausea to respiratory problems and even cancer.

4.ENVIRONMENTAL CONSIDERATIONS

Consideration must also be given to noise and air pollution. Open-cut equipment will be in operation for at least four times as long as trenchless equipment, creating more noise and diesel exhaust and traffic pollution than trenchless methods.

Conclusion

Trenchless techniques provide clear advantages over traditional dig and replace, not only due to the savings associated with direct project costs, but also because they minimize risk to a community's quality of life. Decision makers who look beneath the surface of an initial sewer rehabilitation bid and consider the social and economical risks, can see that trenchless technologies:

- Minimize surface disruptions
- Require less exposed working areas, with less risk to workers and general public
- Minimize the damage to pavement and disturbances to other utilities
- Minimize the need for soil removal, toxic disposal, and are more appropriate for environmental considerations, eliminating the need for mandatory EPA soil testing (required during all open-cut projects)
- Preserve tax revenue transformation from consumer to municipality
- Utilize less heavy equipment and fuels, therefore reducing health hazards to workers and the general public

Reference

Rehabilitation of Underground Water and Sewer Lines The Cost Beyond the Bid by Dr. Gordon Bush, former Mayor of East St. Louis, Ill.

If you have any questions, please contact [Dr. C.Vipulanandan](#)

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