COSTING FOR INFILTRATION IN SANITARY SEWER SYSTEM

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Abstract

The study is focused on developing a model� to estimate the� Life Cycle Cost due to infiltration in Sanitary Sewer System for serving various� population sizes and population densities. The goal is to identify the most cost contributing parameters due to infiltration.

1. Introduction

�It is estimated that there are 4.2 billion feet of sanitary sewer in the U.S (excluding combined sewer), the asset value of this utility is estimated to be $1.0 trillion. The anticipated rehabilitation needs to upgrade this system exceeds $34 billion ,where as the current annual spending for sanitary sewer rehabilitation is� approximately $1.0 billion(excluding new construction). One of the main reasons for this dilemma is up till 1980�s sanitary sewer rehabilitation were primarily limited to dig up and replace by a parallel sewer construction and very little rehabilitation work� was done. This made the rehabilitation cost prohibitive. Due to the advancement� in technology new cost effective methods have been developed� for inspection and� rehabilitation of sewer systems which have made the rehabilitation and maintenance a cost effective alternatives to new construction.

2. Objective

The� objective of this study is to develop� a model to analyze the Life Cycle Cost� due to infiltration in Sanitary Sewer System :

1. To identify important parameters that influence the cost due to� infiltration.
2. To perform sensitivity study on the model and identify the cost components.

Various steps to be followed in the model development� are:

- Break down of various elements of Sewer System into major LCC categories and subcategories.
- Identify the Cost of infiltration associated with� Transportation, Treatment, Maintenance, Regulatory violations, Secondary effects on infrastructure.
- Selection and estimation of parameters to be considered in LCC. Both structural and cost parameters.
- To identify the major elements contributing to infiltration and cost associated with them.
- Compare alternatives and perform break even analysis.

3. Case Study

A study on the Infiltration problem was conducted based on the data provided by Broward County Northern Region, South Florida. Broward Country has a varying population of 113700 and its sewer system is 270 miles. The main point of infiltration is found to be sewer mains, laterals and manholes. An cost analysis of sewer performance was conducted for infiltration of 10 % and 30 % of the total sewer flow. The figures below shows the varying cost with change in population.

	Per Capita Treatment Cost/Day	Per Capita Infiltration� Treatment� Cost/Day	Per Capita Transportation Cost /Day
Infiltration 0% of Total sewer Flow	$1.1	$0.0	$0.014
Infiltration 10% of Total sewer Flow	��������������� $1.2	��������������� $0.07	$0.015
Infiltration 30% of Total sewer Flow	��������������� $1.7	��������������� $0.26	$0.018

4.Conclusion

The basic model incorporated various costs associated with the infiltration in Sanitary Sewer System. Initial� modeling was done using a population of 100,000. Further literature search is being done to develop a more comprehensive LCC model.

5. Acknowledgements

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