

# O & M Expenses for Wastewater Systems and Model Prediction

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## Abstract

Based on the data available in the literature, Operation and Maintenance (O & M) costs for various wastewater systems were determined and compared to the prediction of the CIGMAT-LCC Model. The spreadsheet model is based on the population and average household occupancy and the O & M cost is represented as transportation cost per gallon per mile of the wastewater.

## 1. Introduction

A wastewater system is one of the major assets of our cities. The cost to rehabilitate the wastewater system is in excess of \$200 billion as estimated by the American Public Works Association, where as the current annual spending for sanitary sewer rehabilitation is approximately \$1.0 billion (excluding new construction)[2]. The United States Environmental Protection Agency (USEPA) has estimated that for the nation's 16,000 wastewater systems rehabilitations needs \$140 billion investment over the next 20 years. This includes \$10 billion for upgrading the existing wastewater collection system, \$22 billion for new sewer construction and \$45 billion for controlling combined sewer overflows [3]. The wastewater systems are aging, overused, mismanaged and neglected. The oldest cities in this country have had sewer systems in operation for more than 100 years. While the average age of a sewer is 42 years, almost half of the municipalities across the U.S. have sewers with an average age of more than 50 years [4]. It is important to annually maintain the wastewater systems so that they are operational and hence, determining the O & M cost is essential. Based on the data, the Operation cost varied up to \$25 per person per year and was found to be independent of the population.

## 2. Objective

The objective of this study is to determine the O & M of wastewater systems. The specific objectives are as follows:

1. To determine the O & M cost for various wastewater systems.
2. To calibrate the LCC model for the city to predict the O & M expenses for the life cycle period.

## 3. Operation and Maintenance Expenses

Data from 36 wastewater systems were analyzed and the variation of O & M expenses per capita with population is shown in Fig 1. There is no direct correlation between O & M expenses and population. Per the wastewater study, 53% of the cities had O & M less than \$8, 35% between \$8 and \$16, 9% between \$16 and \$24, 3% above \$24 per year.

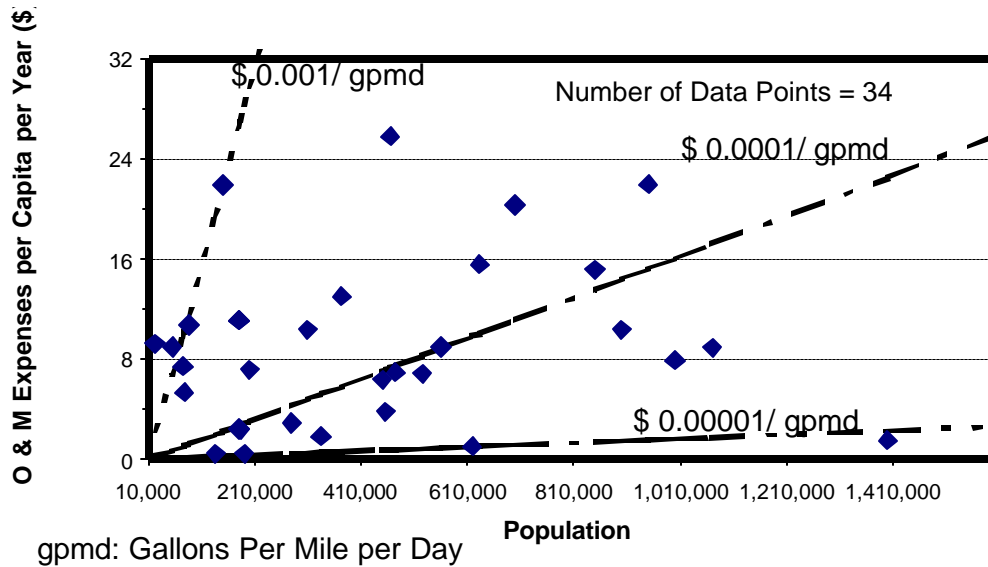


Figure 1. O & M expenses per capita per year : Data and Model prediction

The CIGMAT LCC model was calibrated with the data and the transportation cost varied between \$0.001/gpm/d and \$0.00001/gpm/d.

#### 4. Conclusion

There was no direct correlation between populations and the O & M cost of the cities. Published data was used to calibrate the model.

#### 5. Acknowledgements

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#### 6. References

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