

ABSTRACT

Baik, Hyeon-Shik, Ph.D., Purdue University, December, 2003. Development of an Asset Valuation Model for Wastewater Infrastructure Assets. Major Professor: Dulcy M. Abraham.

Valuation of infrastructure assets has drawn close attention in the U.S. since the Governmental Accounting Standards Board Statement 34 (GASB 34) was issued in 1999. In GASB 34, two valuation methods are recommended: the depreciation method and the modified approach. Depreciation method estimates the asset values by applying conventional depreciation techniques to historical costs or replacement costs. The modified approach emphasizes the extensive control over the infrastructure assets. When using the modified approach, the assets are not depreciated if they are maintained at or above the predefined minimum acceptance level using asset management systems. The expenditures on maintenance activities are recorded as expenses or capital in the annual financial report of governmental agencies, depending on the characteristics of the maintenance activities and the valuation method employed. Both methods recommended by GASB 34, however, do not adequately reflect the deterioration of infrastructure assets.

To account for the condition changes in infrastructure asset values, a valuation method incorporating the changes in the asset condition due to deterioration is presented in this study. The proposed valuation method estimates the asset value based on Markov chain based deterioration models. The deterioration-based valuation value method can reflect the different levels of investments for maintenance and repair (M & R) activities and estimate the future asset values in a probabilistic manner by incorporating the different transition probabilities for different types of M & R activities, such as routine maintenance, preservation, and improvement. The comparisons of asset values obtained from different valuation methods show substantial variations in asset values depending on the valuation method selected.

By incorporating the conditions of infrastructure assets, the deterioration-based valuation method provides a more reasonable basis for governmental agencies for making decisions regarding future investments for M & R activities. This method is also useful for the determination of infrastructure asset values for privatization.