

MUNICIPAL SEWER SYSTEMS

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Summary

This chapter presents the basic concepts of municipal sewer systems and discusses recent problems and issues with the latest technologies. It is important to design effective sewerage systems. Municipal sewer systems may be either combined or separate systems in. Design flows are calculated according to sanitary, storm, and combined conditions. Flows for each sewer are computed using the Manning formula, Kutter formula and others. Ideal velocity of flow is determined with regard to production of odor, H₂S, abrasion, etc. It is also important to select appropriate materials for sewers. In many municipalities, deterioration of sewers has become a social problem. One of the measures to combat deterioration is rehabilitation works such as the cured-in-place method and the spiral liner method. In some cities, utilization of heat in wastewater is introduced. Use is now being made of the Sewer Optical Fiber Teleway Network.

1. Introduction

Municipal sewer systems handle both sanitary wastewater and stormwater. Sanitary wastewater is generally introduced through house inlets into sanitary sewers. Stormwater is generally introduced through stormwater inlets and street inlets into storm sewers. Both are basically conveyed by gravity. Pressure pipes are sometimes

used. In many countries municipalities have full authority concerning construction and management of sewer systems.

The basic function of municipal sewer systems is to convey wastewater to a treatment plant and stormwater to public water bodies. In other words, sewer systems improve the living environment and protect cities and streets from inundation.

It is important to make accurate calculations of flow rate, flow velocity and gradient in order to make rational and efficient sewer systems. It is also important to select suitable materials for sewers and appropriate construction methods. Effective maintenance is also important to maintain efficient function of sewer systems.

In most large cities where sewer systems were constructed many years ago, rehabilitation of deteriorated sewers is an urgent and important task. In some countries, utilization of heat in wastewater or sewer optical fiber networks have been introduced.

2. Combined System and Separate System

There are two types of collecting systems—combined and separate. Combined systems carry away both stormwater and sanitary wastewater in one sewer system. Separate systems take care of sanitary wastewater and stormwater in two different systems

Combined systems are often used because the construction costs are less than that of separate system. Their disadvantage is that stormwater mixed with sanitary wastewater is allowed to flow directly into rivers or the sea in wet weather. In separate systems, stormwater is normally not allowed to mix with wastewater, but it carries pollutants from road surfaces into rivers and seas. The construction is more complex and obviously more expensive, since two different systems are constructed.

In combined sewer overflow (CSO) control, the volume of wastewater going to the treatment plant in wet weather is increased by enlarging the capacity of the interceptor. Moreover, a CSO storage tank is installed to prevent the polluted first flush from flowing into the receiving water in the early stages of a rainstorm. CSO storage facilities are installed at outfalls, pumping stations and treatment plants.

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