

Research on preparation of vacuum sewerage technical manual

Period

1994.6~ 1995.5

51P~ 54P

(Purpose)

Since the saturation level of national sewerage has exceeded 49% by the end of 1993, the further sewage improvement has trended to develop the medium cities, furthermore the municipalities where the financial scale is small, and the population density is low comparing with the large cities.

In such situation, the vacuum sewerage system, though it was noticed as a new sewage transportation system which replaces the traditional-model and natural-draining sewerage, there was large problems in deciding the type before the license application for the municipality which intends to adopt the vacuum sewerage system, because there are three types in this system.

In order to solve such problems, this study does that municipalities and design consultants, etc. can independently design the vacuum sewerage facilities for approval design and other design until basic design without disturbing of the system types by making technical manual which the differences of plan design of individual systems was united as long as possible.

(Result)

Summaries of research result are as follows.

1. Features of the vacuum sewerage

by constructing sewer pipe in shallow underground, the cost of earthworks can be reduced.

By making the diameter of sewer pipe small, material cost and laying cost can be reduced.

It is easy to carry out the construction in alleys with the narrow width, etc..

Construction period can be shortened.

Only relay pump station is supplied with the electric power for the collection of sanitary sewage, the power-cut countermeasure is also easy to make.

Even in case of being damaged, the sanitary sewage is difficult to leak out outside because it is vacuum in sewer pipe.

Discovery of the generation places such as the sewer pipe damage is comparatively easy.

It is limited for the pressure which can be used for the carrier of the sanitary sewage.

It is easy to maintain vacuum valve unit and relay pump station, etc..

2. Conditions of application of vacuum sewerage

The place where has been late for the sewage improvement due to topographical and geographic condition, ground, soil property.

The place where with the rapid population growth, the quantity of water over design flow rate arose, or the flow rate of pipe and drain became insufficient.

The place where the construction cost becomes larger amount, even if to carry out the laying of natural downward flow pipe is possible, because underground installation is congested.

The place where seasonal population fluctuation like the resort ground is intense

The place where can not greatly excavate depth for the nature conservation in respect of landscape.

When wants to cut down the initial cost, and make the gradual construction plan.

The place where desires the early common use of sewerage.

The place where the population density is low.

The place where it is necessary to change the combined sewerage to separated sewerage.

3. On the unification in plan design of the system

Though the main differences of three systems in plan design are such as the suction type of vacuum valve, nominal diameter, longitudinal shape of vacuum sewer pipe, hydraulic calculation, vapor-liquid of the system of relay pump station, capacity calculation of vacuum pump facility, operation degree of vacuum, vacuum pressure generator, capacity calculation of the vacuum generator and operation pressure, transfer pumping equipment, catchment tank, the unification was taken as long as possible.

4. Contents of the manual

The technology manual of vacuum sewerage system was made on the basis of the research result of the foregoing.

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Key Words	Vacuum water system, vacuum valve, vacuum sewage pipe, relay pump station
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