

Investigation research on the steep gradient sewer of Haneo trunk line

Period

1998.12 ~ 1999.3

115P ~ 118P

(Purpose)

As a result of the review of sewage pipe laying construction interval in Haneo district within "Naganohara town specific environmental preservation sewage works", it was judged that it is possible to reduce construction cost of laying pipe by adopting "steep gradient sewerage pipe" in part.

According the features of objective pipeline as steep gradient pipes and little downward discharge (plan drainage discharge =0.001m³/s), the appropriate steep gradient pipe route is designed, and the hydraulic model study is carried out for the pipe structure in respect of setting the energy dissipation structure and verification of the flow ability, and the dimension of steep gradient pipe is decided.

The execution design of sewer is carried out on the basis of the decided dimensions.

(Result)

1. Resource acquisition and field survey

The consolidation of the related materials as a necessity was done for the examination, and the field reconnaissance was carried out for the summary grasp of landforms and geology, etc., and the conditions for setting the steep gradient pipe route was arranged.

2. Examination of steep gradient pipe

By considering constraint conditions of landforms and fields from the superscription survey result, the steep gradient pipe route was decided. And, the installation methods, pipe kinds and base forms and so on were examined in respect of laying pipe route.

3. Examination of energy dissipation system

It is estimated that the flow of steep gradient pipe becomes high-speed flow (over ? =3.0m/s). The energy dissipater is therefore required to install in the lowest end of steep gradient pipe, since downstream flow condition in pipe would not be affected. Though several kind systems of energy dissipater could be considered, the hydraulic jump type- energy dissipation system for being most suitable for the field was adopted, and the basic structure was examined.

4. Hydrology examination

The flow characteristics of energy dissipater were examined for deciding the hydrology dimensions necessary for the model experiment.

5. Study of hydraulic model

The hydraulic model study was carried out in order to decide the optimum shape and verify the flow characteristic of energy dissipater obtained from result of the superscription hydrology examination.

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Key Words

Steep gradient sewage sewer, energy dissipater