Investigation research on perpendicular sewer of Saigawa Azumi area river-basin sewerage		
Period	1999.6～1999.7	

(Purpose)

The manhole with high head has been founded nationally in great numbers. However, because the design technique proven by flow characteristic and theory for high head was not established, there are many problems in respect of structure and maintenance.

With "sewerage utilities plan and design guidelines and explanation", supplementary pipe system and level difference junction and step junction and so on are shown as a joining method of sewer for the steep gradient of surface.

However, for economical reasons, there are many examples of installing the supplementary pipe only for the freely falling of the sewage in the manhole with high head. Problems such as dispersion of sewage, scour of the manhole bottom, increasing of air entrainment quantity, noise, vibration, and odor occur, when such manhole was founded. High head construction methods such as the multistage free fall, vortex and spiral guideway style are devised in order to solve these problems, and had been used practically.

In this organization, the examination of spiral guideway style drop shaft had been carried out since 1994 year, and in 1999 year, "Design data (draft) on the spiral guideway- style drop shaft" was made the followings (1) below 2.124m^3 of design discharge. (2) head of 1.43m (for the f250 of pipe diameter) ～ 20.24 m (for the f1500 of pipe diameter)as the application range.

This examination was carried out for design of the drop shaft, which is planed for high head manhole planned in the Toyoshina construction office in Nagano Prefecture, while make it the case study of the design data (draft) mentioned above.

(Result).

Hotaka first trunk sewerage line in Saigawa Azumi area river-basin of Nagano Prefecture is river-basin sewerage trunk line sewer that has been planned to lay over total length of about 8.7km in Minamiazumi District Hotaka town and Toyoshina town, and flows into the aqua pier Azumi area (disposal facility).

The objected manhole is founded in middle of this trunk line, and it has been planned as a manhole with high head over 2m according the geomorphological condition.

In this research, the knowledge on the optimum structure such as the manhole shape could be obtained in installing multiple drop shafts in one manhole.

The following is the range which shows the dimension of drop shaft as a design object for this time.

drop shaft number : 4 units.

drop shaft diameter : f250～f900.

plan inflow : 0.006m^3/s～0.272m^3/s.

head high : 3.0m～3.9m.

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