

## Investigation research on multi-direction inflow drop shaft of the Kanuma City

Period

2003.8~ 2003.12

105P ~ 110P

### ( Purpose )

In this business, the hydraulic model study is carried out for the multi-direction inflow drop shaft planned in the connection manhole of Moro storm- water trunk line in the Kanuma City for the purpose of setting dimensions and basic structure of the drop shaft.

The examination flow is shown in Fig.1.

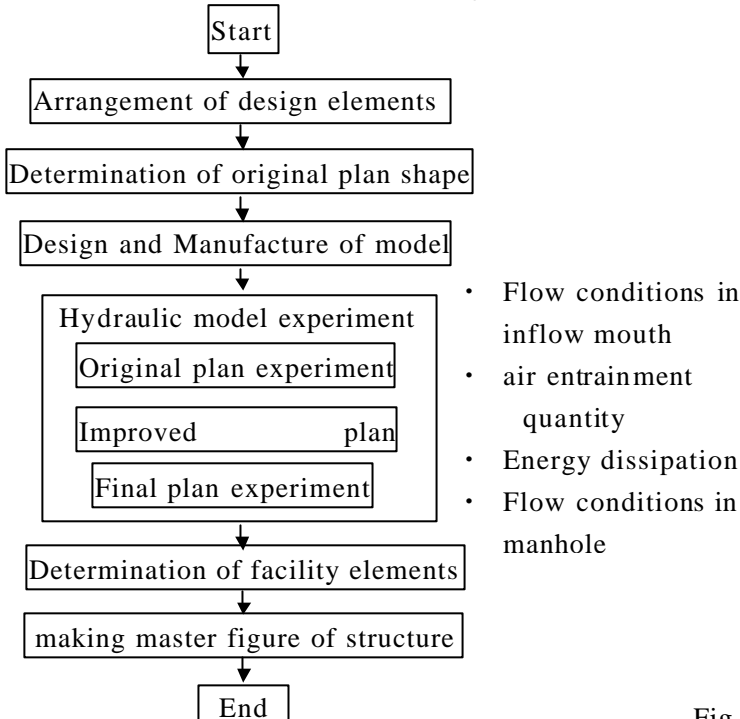


Fig.1 Study flow chart

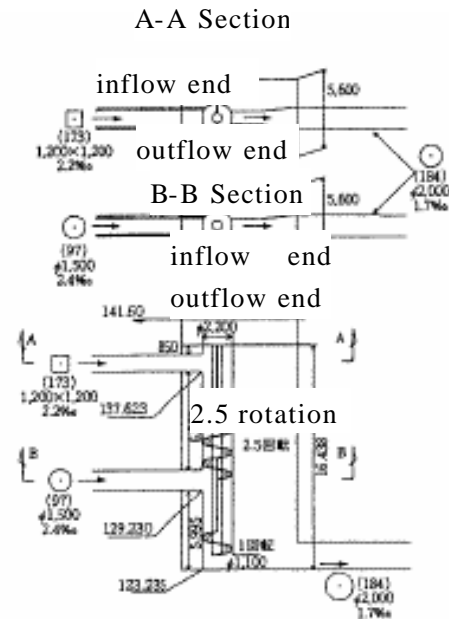


Fig.2 Original plan shape of drop shaft draft

### ( Result )

The basic functions (flow ability, effect of decreasing of the air entrainment quantity, energy dissipation function, flow condition stability) of the drop shaft are satisfied with the requirement.

#### (1) Multi-direction inflow division.

There is no problem on the effect of the backwater of upper and lower inflow for the upstream. And, with the multi-direction inflow, though the flow condition of oral region was disturbed a little in comparison with the normal form state, it was in allowing range, especially, there is not phenomenon confirmed as a problem either.

#### (2) Air entrainment quantity

In comparison with other head control style, this drop shaft is an advantageous structure which can reduce the air entrainment quantity. However, it is necessary to establish the exhaust facilities in such manhole and downstream manhole for the open channel (dry and uniform flow condition), because the air of 24.6% and 15.7% is respectively taken to the downstream.

#### (3) Energy dissipation function

For about 14m head from the upper inflow pipe to the drop shaft bottom, the pressure which affects the drop shaft bottom is about 5m of water head even in the maximum. For head treatment structure of conventional plunging style, it usually falls from 14m height directly, with adoption of this drop shaft it can reduce to about 1/3 of the water head of conventional.

#### (4) Flow conditions in Manhole.

Without being eccentric, the current almost straightly flow down along the downstream pipe from

outflow pipe. Though the water level slightly heaves near right and left wall of manhole, the heaved quantity is in allowing range.

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Key Words

drop shaft, high head treatment, multi-direction inflow, air entrainment quantity, energy  
dissipation function, hydraulic test J903B1002