

Study and Research on Cleaning Effect of Simplified Flushing in an Improved Inverted Siphon (a unique study)

Year of research	2010	Construction of efficient sewage
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(Purpose)

Structurally, inverted siphons are in a state that allows steady storage of wastewater and thus easy accumulation of soil and scum. Improved inverted siphons (Fig. 1) are said to accumulate less soil, etc. because of structural features such as the elimination of the inverted siphon chamber used in conventional models. However, regular cleaning is required even in the improved types because accumulation is not completely prevented.

Inverted siphons are generally cleaned by using a combination of high-velocity jet truck and vacuum truck. Another simplified method that does not require power is to flush out wastewater stored on the upstream side by means of traction, washing away any deposits in the inverted siphon pipe.

This study was undertaken to confirm the effect of flushing using a cut-off plug (Fig. 2) in a simplified deposit flushing method.

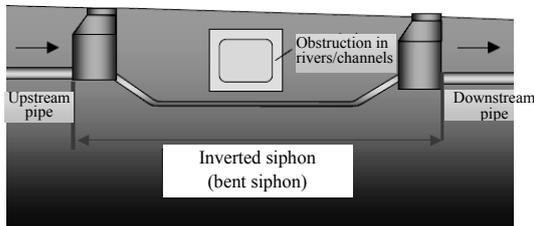


Fig. 1. Improved inverted siphons



Cut-off plug used to stop water flow and store enough water to create flow speed needed when flushing.

Fig. 2. Cut-off plug

(Results)

The results of this study are summarized below.

- The capability of flushing to wash away about 90% of mass of deposits by traction was demonstrated (see Table 1).
- It appears that some soil mainly of small particle size was flushed downstream.

Table 1. Mass of deposits before and after flushing (traction rate)

Item	Facilities A	Facilities B	Remarks	
Mass of (wet) deposits before flushing (kg)	309	67	Estimated from past survey results	
Period when cleaning is not done	Two years and seven months	One year and seven months		
Mass of deposits (wet) after flushing (kg)	22	10	Measured values	
Traction mass (kg) ②	287	57	Estimates	
Traction rate (%) ②/①	93	85	Estimates	
Reference	Average flow velocity during flushing (m/s)	About 2.7	About 0.9	Estimates
	Reserved water depth on the upstream side (m)	1.040	0.415	Measured values

(Conclusion)

No special equipment (providing power) is used for traction of deposits by flushing. This method is easy to use for offering the traction effect. It is effective as cleaning of an improved inverted siphon pipe. Since this method requires water for flushing, the prerequisite will be to secure a sufficient flow velocity for traction of deposits. It is also essential to carry out flushing while paying attention to changes in the water level in the pipe, so as to prevent overflow on the upstream side during storage.

The results of this study will be presented, as reference data, in the Technology Utilization Guide (draft) to be published by the Secretariat of the Steering Committee for Prompt Sewerage Development.

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