

Study on a Pilot Program for a Quick Project (City of Handa)

Year of Research

2008

(Purpose)

In FY 2006, the Ministry of Land, Infrastructure, Transport and Tourism launched a “Quick Project to Eliminate Unsewered Areas” and is conducting a pilot program to introduce a new method that enables the construction of a sewage system at a low cost and within a short construction time.

The purpose of this study is to analyze and evaluate data on the performance of the techniques chosen by the City of Handa—“continuous use of improved inverted siphon,” “construction relevant to road alignment,” and “use of displaced soil for culvert foundation”—and to examine the effectiveness of these techniques.

(Results)

Table 1 shows examination items for each technique.

Table 1 Results of examination

New Techniques	Examination Items	Results
Continual adoption of Improved Inverted Siphons	Reduction in construction costs	A cost reduction of 68% was achieved as a result of the reduction in the length of the jacking zone due to the route change.
	Maintenance costs	The use of this technique is estimated to be advantageous in terms of the total cost over a span of 50 years, including maintenance costs, as a result of the reduction in construction costs.
	Downflow capability	In an intermediate range of 60 m, the upstream inverted siphon is not affected by the backwater from the downstream inverted siphon.
	Solid deposition	In one year of operation, the blocking ratio was approximately 20%.
	Reduction in construction time	A 56% reduction in construction time was achieved as a result of the reduction in jacking zone due to the route change.
	Ease of using maintenance equipment and material	No problem with maintenance (cleaning, inspection)
	Effect on living environment	No effect
	Emergency action	Confirmed by simulating overflow control performed by using the backup pipe
	Cleaning effect by flushing	A certain degree of cleaning effect
Variable Slope Sewer Construction Using Bent Pipes	Reduction in construction costs	A 20% cost reduction was achieved as a result of shallower excavation and the elimination of manholes.
	Maintenance costs	No effect on maintenance costs
	Downflow of sewage	The actual velocity in the steep culvert was below 3.0 m/s.
	Solid deposition	No deposit was found in the zones without manholes and steep zones.
	Reduction in construction time	No significant reduction in construction time in the entire route that was examined.
	Ease of using maintenance equipment and material	No problem with maintenance (cleaning, inspection)
	Effectiveness of special measures in burying positions in zones without manholes	The burying position can be identified easily and economically by offset management from the structure.
	Effect on living environment	No effect
Reuse of Dug Soil as Pipe Foundation	Reduction in construction costs	A 13% cost reduction was achieved as a result of shallower excavation and the use of cheaper foundation material.
	Effect on pavement	No effect
	Effect on siphon (deformation)	No effect; the deflection ratio was below 1% for 90% of the route.
	Reduction in construction time	A 23% reduction in construction time was achieved as a result of shallower excavation.

Fig. 1 Continual adoption of Improved Inverted Siphons

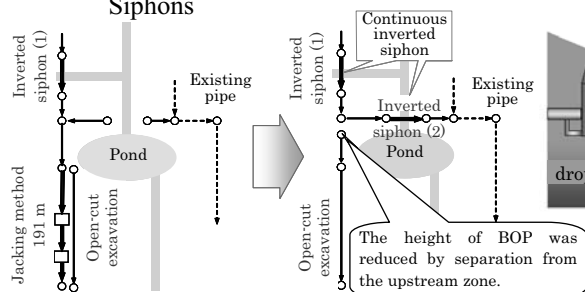
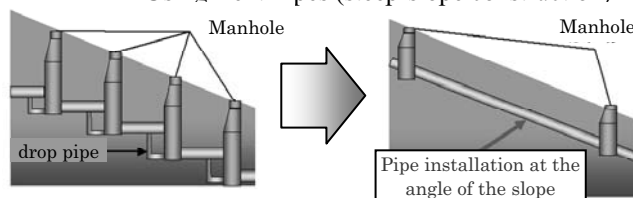


Fig. 2 Variable Slope Sewer Construction Using Bent Pipes (steep-slope construction)



(Conclusion)

This study confirmed the effectiveness of each technique in eliminating unsewered areas.

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Key words

quick project, improved inverted siphon, variable slope sewer construction using bent pipes, displace soil foundation