

Study on Sewerage Quick Project in Mashiki City

Whole Term

Fiscal year 2008 and 2009

Sewer development in unsewered area

(Purpose of the Study)

This study was carried out as Sewerage Quick Project to verify the effectiveness of “exposed sewer laying” and “serial siphon culvert” adopted in Mashiki City.

(Results of the Study)

The item verified by this study and result obtained are shown in Table -1 and Table -2

Table-1 Result of Verification (exposed sewer laying)

Item	Results			
	Scale	Conventional method	Proposed method (Exposed Sewer Laying)	Ratio of reduction
Cost Reduction	φ 100 135m	12,000 thousand yen (88thousand yen/m)	2,300 thousand yen (16thousand yen/m)	82%
	<ul style="list-style-type: none"> • Maintenance carried out through visual check as before (→ no reduction in maintenance cost) 			
Material Characteristics	<ul style="list-style-type: none"> • Resistance to ultraviolet rays and temperature: No significant strength reduction was observed after one-year exposure to the air. • Expansion and contraction: The net expansion and contraction (max-min) was 60 - 70% of the theoretical value. Since leakage was observed at joints, change of the joint was required as a countermeasure. 			
Flow Condition (freeze)	<ul style="list-style-type: none"> • Freezing was not observed although the day time temperature dropped to 0°C during the study 			
Change in Water Quality (Decomposition)	<ul style="list-style-type: none"> • The generation of hydrogen sulfide (decomposition) was not observed in summer condition (34°C). 			
Construction period	Scale	Conventional method	Proposed method	Ratio of reduction
	φ 100 135m	31 days	13 days	58%
<ul style="list-style-type: none"> • Large reduction was achieved by eliminating the need of pipeline earthwork and earth retaining work. 				

Table-2 Result of Verification (serial siphon culvert)

Item	Results			
	Scale	Conventional method	Proposed method	Ratio of reduction
Cost Reduction	Upstream φ150 (upside)6m(downside)5m Downstream φ150 (upside)5m(downside)5m	172,000 thousand yen (116 thousand yen/m)	121,000 thousand yen (98thousand/m)	29%
	<ul style="list-style-type: none"> • Since sufficient flush out flow is obtained by a public bath facility upstream, which constantly discharges a large amount of wastewater, the deposition does not occur inside the siphon, then there is no maintenance cost increase by this method. 			
Flow capacity	<ul style="list-style-type: none"> • The upstream of the Siphon is hardly influenced by the backwater effect of the downstream side. 			
Deposition of Solid	<ul style="list-style-type: none"> • There are facilities (public bathhouse) discharging large quantities of wastewater, and the flow in pipe has proper flush out strength. Therefore, occurrence of deposition inside siphon is not observed. 			
Construction period	Scale	Conventional method	Proposed method	Ratio of reduction
	Same as above	240 days	190days	21%
<ul style="list-style-type: none"> • Serial siphon culvert reduces pipe laying depths and thus enables to adopt open cut method, leading considerable shortening of construction period. 				
Workability of Maintenance Equipments	<ul style="list-style-type: none"> • Common maintenance equipments are available. 			
Influence on the Living Environment	<ul style="list-style-type: none"> • Odor and noise are within the criteria and there is no adverse effect to the living environment. 			

(Conclusion)

The result shows that the facilities shall function satisfactorily without major problems. In addition, economical efficiency and shorter construction period shall also be achieved. The result indicated that the adopted technology is effective

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Keywords

Sewerage Quick Project, Exposed Sewer Laying,, Serial Siphon Culvert