

## Study on Detailed plan of sewer pipe in Okazaki City

Study years

FY 2008・FY 2009

Elimination of areas with unsewered population

**(Purpose)**

The Ministry of Land, Infrastructure and Transport started the Quick Project for Prompt Sewerage Development in FY2006. In the Quick Project, social experiments have been conducted in which innovative methods based on local characteristics have been introduced to enable cost reductions and time-saving in sewer construction.

This study was conducted to evaluate the performance and effectiveness of “Variable slope sewer construction using bent pipes” adopted in Okazaki City.

**(Result)**

The result of the evaluation is summarized below.

Table-1: Results of evaluation

Evaluation item	Results				
Construction cost	Scale	Conventional method (thousand yen)	New method (thousand yen)	Reduction ratio (%)	Remarks
	φ200 994m	58,000 (58)	48,000 (48)	16.6	Based on construction costs as ordered (including overhead)
* Values in parentheses indicate unit prices per meter for conventional and new methods.					
Effect on operation and maintenance cost	<ul style="list-style-type: none"> <li>· Use of steep slope sewers leads to reduced excavation depth, with lower earthwork and retaining work costs.</li> <li>· Considerable cost reduction resulted from elimination of manholes</li> </ul>				
Sewage flow	<ul style="list-style-type: none"> <li>· Operation and maintenance costs are not significantly different from those incurred when conventional methods are used.</li> </ul>				
Sedimentation of solids	<ul style="list-style-type: none"> <li>· Actual flow velocity was less than 3.0 m/s for the design wastewater flow along the steep route.</li> <li>· Wastewater flow was generally smooth.</li> </ul>				
Sedimentation of solids	<ul style="list-style-type: none"> <li>· No sedimentation due to use of bent pipes was observed.</li> <li>· No problems encountered due to solid flow in steep slope sewers</li> </ul>				
Construction period	Scale	Conventional method (days)	New method (days)	Reduction (%)	
	φ200 994m	100	81	19.2	
<ul style="list-style-type: none"> <li>· Steep slope sewers lead to reduced excavation depth, with lower earthwork and retaining work costs.</li> <li>· Considerable cost reduction resulted from elimination of manholes.</li> </ul>					
Workability of maintenance equipment	<ul style="list-style-type: none"> <li>· General maintenance equipment (television inspection and high-velocity jet) workable</li> </ul>				
Applicability of locating markers at manhole omission points	<ul style="list-style-type: none"> <li>· Maximum locating error of pipe position by electronic markers laid underground was only 8cm, therefore accuracy was sufficient.</li> </ul>				
Impact on surroundings	<ul style="list-style-type: none"> <li>· Noise : 47 to 54dB;Odor : Odor index less than 10;Hydrogen sulfide: maximum 4.4ppm</li> <li>· Observed values of odor, noise and hydrogen sulfide were below the regulation standards (evaluation values). Therefore no adverse impact on surroundings was found.</li> </ul>				

Summary:

No problems attributed to curved and steep slope construction were observed over the one-year and half evaluation period after the system was put into service. Since the new method proved to be effective to a certain degree in terms of the construction cost and period when compared with the conventional method, the technology is considered to be an effective method to use to reduce the unsewered population.

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Keywords

Prompt Sewerage Development, Variable slope sewer construction using bent pipes, Social experiment, Evaluation, Construction cost reduction, Construction period reduction