

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

Year of Research

2008, 2009

Elimination of Unsewered Areas

### (Purpose)

In FY 2006, the Ministry of Land, Infrastructure, Transport and Tourism launched a “Quick Project to Eliminate Unsewered Areas,” under which a pilot program is being implemented to introduce a new sewer construction technique that is quick, low-cost, and takes local characteristics into account.

The purpose of this study is to analyze and evaluate data on the performance of the “use of excavated soil for culvert foundations” technique adopted by the city of Handa in order to verify its validity.

### (Results)

Table 1 shows the items examined in this study and the results of the examination.

Table 1 Results of the examination

Examined item	Results				
	Scale	Conventional technique (thousand yen)	New technique (thousand yen)	Reduction (%)	Comments
Cost reduction	φ150/505 m	9,499 (19)	7,766 (15)	18.2	Residual soil: approx. 99% reduction
	<p>Note: The numbers in parentheses for the conventional and new techniques denote the unit prices per square meter.</p> <ul style="list-style-type: none"> <li>The new technique can reduce the difference in unit cost and the disposal cost of surplus soil equivalent to the cost of purchasing sand by using excavated soil as a pipe foundation material.</li> <li>The use of ground embedment reduces the cost of earthwork and earth-retaining work, resulting in a significant cost reduction.</li> </ul>				
Suitability for pipe foundation material	<ul style="list-style-type: none"> <li>All the samples had a degree of compaction of over 90% and were soil Classes 1–3 (Class 3 soil was used after water content adjustment), meeting the standards applicable to pipe foundation materials.</li> <li>An interview with the construction contractor suggests that the number of rolling compaction operations should be increased to obtain the standard degree of compaction when using excavated soil.</li> </ul>				
Effect on pavement	<ul style="list-style-type: none"> <li>During temporary restoration work, the settlement of the road surface tends to increase (sand foundation: 6 mm → excavated soil foundation: 12 mm), but it does not reach the reference value of 20 mm.</li> <li>The settlement can be reduced by sufficiently compacting the soil by more than 90% during construction.</li> </ul>				
Effect on pipes (deformation)	<ul style="list-style-type: none"> <li>For roads with heavy traffic, culverts tend to contract vertically, and therefore, attention should be paid to the amount of traffic when applying this technique.</li> <li>The average maximum deflection for all roads during examination was within the reference value (5%). In addition, statistical analysis shows that the reference value is unlikely to be exceeded.</li> <li>Due to the large change in deflection over time, roads subject to large deflection during construction require attention to the progress of deflection.</li> </ul>				
Reduction of construction time	Scale	Conventional technique(days)	New technique (days)	Reduction (%)	
	φ150/505 m	24.5	21.0	14.2	
<ul style="list-style-type: none"> <li>The use of ground embedment reduces excavation depth and eliminates earth-retaining work for conduits, resulting in a significant reduction in construction time. A reduction in the length of earth-retaining sheet piles also contributes to the reduction of construction time.</li> </ul>					

### (Conclusion)

In the one-year examination period after the sewer line was placed in service, no problems were attributed to the use of excavated soil as the foundation. The construction cost and time was reduced to a certain extent by eliminating excavation for embedment.

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Keywords

Quick project, excavated soil foundation