

# Study on revision of Area-Saving system of shield departure shaft lot

Year of Research

2008

**(Purpose)**

The Area-saving shaft system is an innovative technology developed in 1993 by a joint research between Japan Institute of Wastewater Engineering Technology (JIWET) and a group of private companies. This system has advantages over the then existing systems in that it can save the area required for the departure shaft lot to about a half (1/2) to one third (1/3) and that it enables a flexible construction sites that meets the actual site conditions, among others. By May 2003, the system was actually introduced in 25 construction projects in total throughout the country. The various technologies obtained from the successful results of these construction projects were put in order by another joint research to finally issue the “Technical Manual of Area-saving system of shield departure shaft lot” in March 2004. As of the end of July 2007, the system has been successfully employed in 41 construction projects, and its technological elements have been introduced into design, increasing the needs for the system.

To meet such growing needs, this study aims to develop computing software for solid recovery system and slurry concentration system that will support design works for slurry treatment facilities and review the contents of the above-mentioned published edition of the technical manual in an effort to prepare its revised edition, which shall include design examples and other additional information much demanded by users.

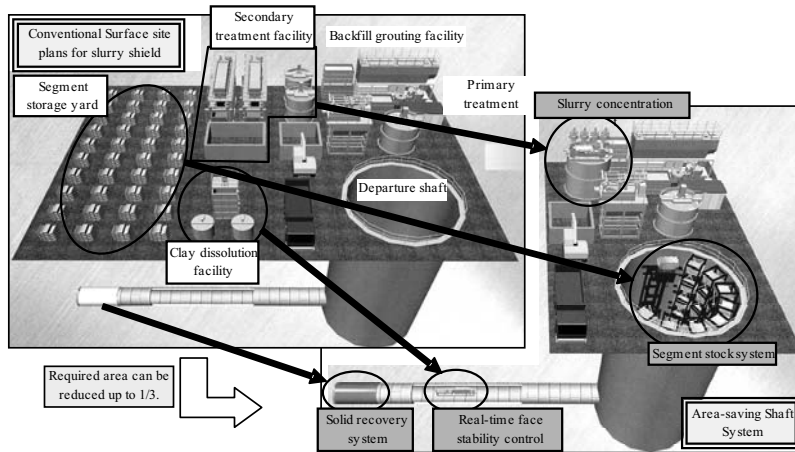


Figure 1 Sketch illustrating the introduction of the Area-saving Shaft System

**(Results)**

The following items (1) to (5) were reviewed taking into account the practical use of the system and the results of review were incorporated into the revised edition:

1. Support for slurry treatment facilities design works

(1) Development of design software

To support the mass balance estimation, which is required for defining facilities specifications, number of units and soil volume to be processed, a mass balance estimation flow sheet was developed in accordance with slurry circulation flow to simplify design of the slurry treatment facilities.

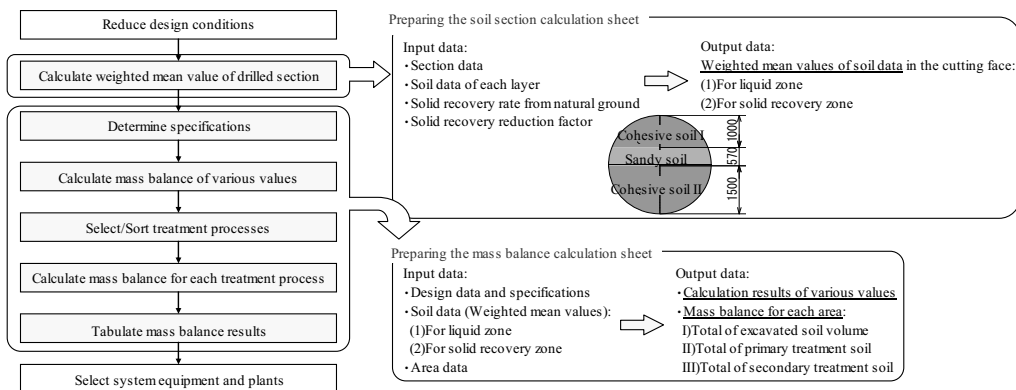


Figure 2 Mass balance estimation flow sheet

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## (2) Addition of mass balance design examples

The 2004 edition contained the drilled section of a single layer as design example. The revised edition contains additional information on a multilayer design pattern.

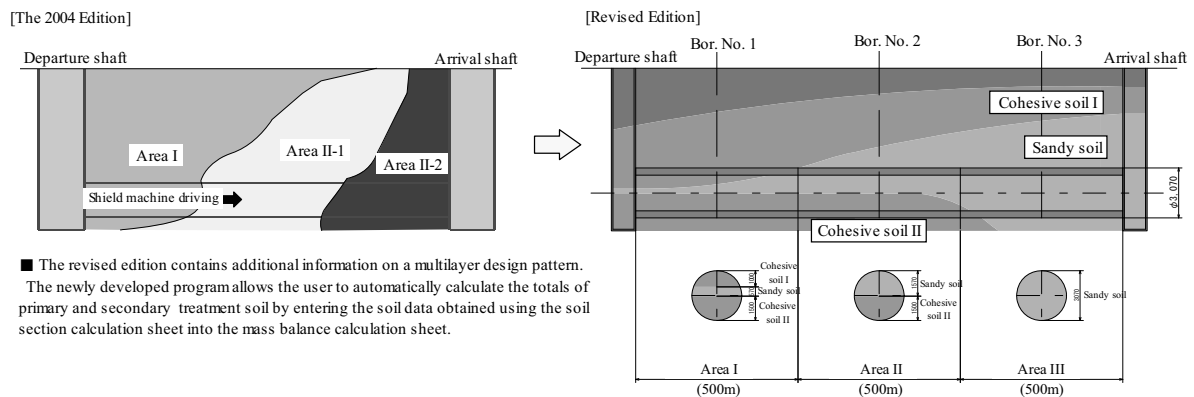


Figure 3 Added pattern of design example

2. Revision of the “Technical Manual of Area-saving system of shield departure Shaft lot” issued in March 2004

### (3) Modification of the slurry treatment facilities configuration

The slurry treatment facilities configuration was reviewed taking into account the practical operation results of the system at actual construction sites as well as future technological improvements. As a result of review, the temporary slurry tank was removed from the slurry circulation flow.

### (4) Change of specifications for soil conveyor pressure pump

Considering that four years have run out after issuance of the 2004 edition, the pump specifications were reviewed and partially changed based on the latest data and documents.

### (5) Enlarged scope of application of the simplified segment stock system

The stock system was redesigned so that it meets the segment shapes from compact shield tunneling method.

3. Product: The revised edition of the “Technical Manual of Area-saving system of shield departure Shaft lot” was issued.

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Key words

Shield tunneling, Area-saving, Sludge reduction, Recycling