

Cooperative research on save area system of shield construction departure shaft lot

Period

1993.4~ 2001.3

55P ~ 62P

(Purpose)

For the shield construction in densely urban district, the case which the security of the departure shaft lot is difficult increases. Considering such situations, it has made to develop the technology which can deal with various lot shapes by decreasing the necessary area of the shield departure shaft lot (the saving area) as the purpose of this study. Comparing with the traditional location method of double stratifying or unreasonable packing the facilities, the saving area system of shield departure shaft lot is the epoch-making technology which can ensue the security of the lot and improvement of surroundings without effecting safety, workability by only reducing necessary area of the shield departure shaft lot.

It is the segment stock system (the dolly type) as the development and research of elemental technology in the 1998, and the elemental experiments of development of the real machine and the solid recovery system were carried out. In addition, as a demonstration construction, this system is adopted in Chiyoda outside Kanda reconstruction work (Akihabara) ordered by the Bureau of Sewerage center construction office of Tokyo Metropolitan Gov., and Okamura branch line construction work ordered by the Bureau of Sewerage of the Yokohama City, and the construction works are being carried out.

(Result)

1. Development of the elemental technology

(1) Segment stock system.

The real machine of dolly type which could solidly store segment stock yard in the shaft was developed. Also, by the standardization, the stock rack was unitized, and the installation time was also drastically shortened further due to using the steel products, the diversion of the members of this stock rack and parent machines became possible except for level traveling rail. In addition, the mill trial was carried out, and storage and movement to the stock rack were automatically carried out with one button operation, and the improvement in labor saving and safety by this system was confirmed.

(2) Solid recovery system

By recovering soil in the solid state more, the load of primary treatment facility and secondary treatment facility was reduced, and the system which could attempt the miniaturization of the facility was developed. There is some the new effect of reducing weight of construction sludge which arises by the secondary treatment, since penetration quantity of clay fraction to muddy water decreases by adopting this system. The experiments of cutting and long-distance transport were carried out prior to the development of this system.

1) Cutting experiment

It was confirmed that the shape of cut solid matter can be controlled with the width by changing the interval of the precedence bits, and with the depth by the cutting depth of the main bits.

2) Long-range transport experiment

In case of transportation distance 1200m, the solid recovery rate became 65- 80%. It was proven that that pipe flow velocity is rapid and solid matter is big was higher on the recovery rate. And, the lowering of the recovery rate was proportional to the distance.

2. Demonstration construction

In Chiyoda outside Kanda reconstruction work (Akihabara) ordered by the Bureau of Sewerage center construction office of Tokyo Metropolitan Gov., it was almost made the saving area in comparison with the conventional type to about 1/3 of lot area by adopting all elemental technologies of the saving area shaft system. In Okamura branch line construction ordered by the Bureau of Sewerage of the Yokohama City, the concentration cyclone was adopted in the narrow lot.

3. Preparation of technical manual

Saving area shaft system design manual (draft) [the muddy-water-method shield edition] which reduced the shield departure shaft lot on the basis of research result until now was made.

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Key Words

Area-saving, segment stock system, solid recovery system.