

Investigation research on the use of wide segment in second Asakusa trunk line construction

Period

1999.5 ~ 2000.3

49P ~ 54P

(Purpose).

Though the width of standard segment in the shield construction is 1.0m, the efficiency improvement of construction has been carried out in shield construction with over the intermediate caliber by increasing the segment width to 1.2m. In this investigation research, the actual conditions of first lining construction is investigated, and the comparison of the excavating quantity per day is done between the new wider segment and standard segment in second Asakusa trunk line construction ordered by the Bureau of Sewerage of Tokyo Metropolitan Gov., as the research purpose.

(1) Survey items

excavating quantity per day using machines first lining construction cost construction period.

(2) Outline of Second Asakusa trunk line construction

slurry shield segment outer diameter 4550mm (6 division) extension 700m gravel (the largest particle size 240mm).

In addition, because the excavated soil was put in disposal facility temporary, and was carried out by the shipping during construction, the driving quantity per day will be not restricted by the capacity of the soil treatment facilities in general.

(Result).

(1) The survey result on actual situation of the shield driving quantity per day will be shown as following (work day= daytime and nighttime of 2 changes).

	Standard segment (width 1000m)	Extensive width segment (width 1200m)	Variation
Initial driving interval	3.6	2.9	-0.7
Straight driving interval	7.2	9.6	2.4

The driving quantity per day of the standard segment is based on "the Ministry of Construction sewerage construction integration standard" 1999 edition.

(2) Comparison of first lining construction expenses

Because there are sharp curved line intervals in this construction, so it can not be simply compared, and only describes the changing items of the cost.

1) Elements of cost reduction enhancement of the driving quantity per day decrease quantity of bolt, sealant RC segment cost.

2) elements of cost increasing :

increase in shield and mechanical loss fee and size of the shaft with machine length increasing (+685m).

enlargement of the machinery of the treatment facility in the excavation.

mould production cost by using the curve interval standard segment.

The cost reduction effect will be bigger as the digging distance improves, because the fixed-cost element is abounding for the cost increase elements.

(3) Comparison in the construction period will be shown as following (this wide construction interval 547m).

	Standard segment (width 1000m)	Extensive width segment (width 1200m)	Variation
Construction period of first lining	87	75	75

The initial driving interval is only compared in first lining driving, and the curve driving interval is excluded.

It is the comparison only of the construction days, and the working rate is not included.

(4) Future problem

The excavation distance is necessary to some extent for the cost reduction, since the difference of increase of the driving quantity per day and shaft construction cost is a largest element of the cost reduction. And, the cost increase quantity is all variable in individual constructions. Therefore, in order to generalize, the more many investigations seems to be the necessity on the necessary excavating length for cost reduction by the wide segment used in present state by examining it in individual construction.

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Key Words	Slurry shield, concrete segment, wide segment (width1.2m), gravel quality soil
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