The research on arbitrary cross section shield tunneling

| Period       | 1993.9〜1995.7 | 53P-55P. |

( Purpose )
In order to satisfy the needs of society such as security of city function and maintenance of the living environment, shield tunneling is abundantly used as the method which constructs the tunnel in urban district. On the cross-sectional shape of shield, the circular cross-section is the mainstream because of having been steady on structural mechanics until now. However, overcrowding of underground installations is increasing with the high density of the city recently, the necessity of the technology that tunnel can be constructed with the security of separation with established structures or base has been rising. Especially, in order to ensure the sewer gradient which is fundamental for the natural downward flow, the sewerage tunnel is often constrained by cross-sectional shape and depth, as result the shield tunneling which can choose various cross-sectional shapes has been required. The arbitrary cross section shield tunneling was developed in order to respond to such requirements from society, and it is also the technology which can construct tunnel of optional cross sections such as rectangle, elliptical shape, and horse’s hoof type as responding to necessity.

In this cooperative research, that making the necessary manual on rectangular cross section which the establishment of the technology has already been attempted by field experiment for design and construction is made as the purpose.

( Result )
During 3 years of this cooperative research, "design manual (draft)" was made in 1993. The contents of "design manual (draft)", by setting "rectangular cross section" of arbitrary cross section shield tunneling as the object, is consisted of 4 parts "first paragraph general remarks", "second paragraph shield", "third paragraph first lining", "fourth paragraph secondary lining". Additionally, the "construction and construction management" was described as appendix materials. The content of each paragraph refer the "tunnel standard detail (the shield edition)", only different items from circular cross section are mainly described.

After 1994, the demonstrative research will be carried out in site where adopted the rectangular cross section by actual shield construction.

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Key Words | Excavator, driving wheel and connection rod, rectangular cross section, cutter frame.