

4. Development of the System to Exchange the Cutter Bits at the Shield Tunnel

-The Demonstration Experiment of the Slide-Cutter Method of Construction-

Hiroaki Muranaka, Yoshimi Oota, Naoki Nishimura
Yasuo Takatsuka, Takuroo Yunoki, Kenji Mikami

In the shield driving method under the condition of long distance or various soil qualities, usually it is necessary to exchange cutter bits because of abrasion. Exchanging bits needs high cost and long term of construction. Without exchanging cutter bits, not only cost reduction but also construction period reduction can be available.

Therefore, we developed the mechanical method of exchanging cutter bits (Slide-Cutter Method of construction). We made a cutter spoke double structure, one is fixed, and the other is movable both forward and backward. For example, in the clayey soil We use only fixed cutter spoke, but in the sand mixed round stones We increase cutter bits to slide movable cutter spoke forward.

We used our development of the system in the long distance shield tunnel construction. Our findings of the survey are followings.

- 1.The sliding mechanism works smoothly in the ground at the short time.
- 2 The sliding mechanism has enough strength.
- 3 The abrasion of the bit with our sliding mechanism is smaller than of usual cutter bit. The shield machine with our developing mechanism can dig longer tunnel than the usual one.

Key words : exchange cutter bits, compound ground, construction of long distance,slide-cutter, abrasion of the bit