

2. Development of the Steel Pipe Injection Fore-piling System of Smaller-diameter and Medium Length Type

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As the supplementary construction method utilized for the stabilization of the mountain tunnel face, it has been increased the application results of the pre-supporting system, which is the injection fore-piling method with the long length pipes. And it is going to be recognized that this method shows the higher bearing capacity and the better cost-performance among the various supplementary construction methods for the stabilization of the tunnel face.

The newly fore-piling system with the medium length and smaller diameter steel pipes has been originally developed, in which the bearing capacity and the cost-performance are over the par to the long steel pipe system. In the hardware phase of this system the following features can be pointed out.

- i) The steel pipe and the bit are the standardized and cheaper product.
- ii) It is not necessary to enlarge the tunnel cross section accompanied for the installation of the long steel pipe system.
- iii) The drilling capacity is added at the tip part of the steel pipe.

The other side, the feature of the software phase of this system is the mechanism of the bearing capacity against the loosening load at close vicinity of the tunnel face, which is derived from the steel pipe axial rigidity.

In this report, the outline of such newly fore-piling system with the medium length and smaller diameter steel pipes is presented with the special concern to the structural feature of the hardware.

Key words : mountain tunnel, supplementary construction method for the stabilization of the tunnel face, steel pipe injection fore-piling method, injection fore-piling method with medium length and smaller diameter steel pipe