Construction of an underground discharge duct with prefabricated steel-concrete composite segment rings along a 3D composite curved path

Satoshi HASHIMOTO ► TAISEI CORPORATION

When constructing an entrance shaft for shield tunneling in an urban area, inevitably the project faces many difficulties due to the limited land acquisition and restrictions from underground structures, therefore complicated alignment for tunneling (sharp curves and steep slopes) must be planned. The solution generally used to overcome these problems is to build a rectangle box structure of cast-in concrete.

To curtail the maintenance costs for facilities with complex structures, alleviate requirements for skilled manpower for construction, and minimize the risks of quality and safety as well as to shorten construction periods, we have successfully developed a new unique technology for a shield project planned by Kobe City for the first time. The fundamentals of our technology are as follows: steel-concrete composite segment rings are assembled above ground with external bolts, and the rings thus assembled are introduced underground to form the discharge underground duct.

Photo 1 3D curved path of a discharge conduit

Photo 2 Assembly situation of composite segment rings