

5. Development and Application of a Shield Tunneling Technology in Gravel Layer -Greatly Improving Construction Efficiency by Establishing a Plastic Flow Management Method-

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In shield tunneling in gravel layer, numerous problems have been happened and reported such as “decreasing of excavating speed due to an abnormal increase in cutter torque”, “abnormal wear of cutter bit or cutter head” and “settlement of ground”. In order to solve the above problems, we have been developing new shield tunneling technology through the design of 10 shield tunneling machines and 8.3 km of shield tunnel construction management in the two projects, Taiwan Taoyuan International Airport Access MRT CU02A and Taipei MRT Circular Line CF640. As a result, the cutter torque and the wear of cutter bit in gravel /boulder layer could be reduced to the level of sandy silt layer by maintaining the plastic flow at the appropriate level. The technology is generally applicable to a shield tunneling for earth pressure type shield method in gravel layer. And applying the technologies will make great contributions to the improvement of productivity of shield tunneling in gravel layer. This paper presents application example of the technology and describes its effectiveness.

Key words: shield tunneling technology in gravel layer, plastic flow management,
reduction of cutter torque, reduction of wear of cutter bit, control of ground deformation