

1. Development of Compressed Section Shield Tunneling Method (Part 2) - Excavation Experiment of Beam Cutter Shield Machine -

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Parts of the expressway tunnels scheduled to be built in the suburbs of metropolises possibly pass through areas where the ground conditions change from the weak ground on the plains to the relatively hard ground in mountains or through “the boundary regions between the shield tunneling method and the mountain tunnel method”.

The compressed section shield tunneling method was developed for constructing tunnels through such a boundary area (unconfined compressive strength of the ground: 0.1 to 10 N/mm²). The method will have a construction speed and environmental impact equivalent to those of the ordinary shield tunneling method and a similar economic efficiency to that of the mountain tunnel method.

Development of a beam cutter shield machine and segments of compressed section are the two wheels in the development of the method. This paper describes an overview of an excavation experiment conducted using a beam cutter shield machine and the results of an experimental analysis. The main objectives of the experiment were to examine the control performance of the beam cutter and understand the relationship between the ground characteristics and excavation data.

Instructive knowledge on the topics was obtained by the experiment and will be a technological foundation for designing an actual machine.

Key words : compressed section, shield tunneling method, boundary region, excavation experiment, beam cutter