

# Shallow Large Tunnel Construction in Hard Lava and Soil-like Scoria with Soil Improvement at Mt. Fuji Area

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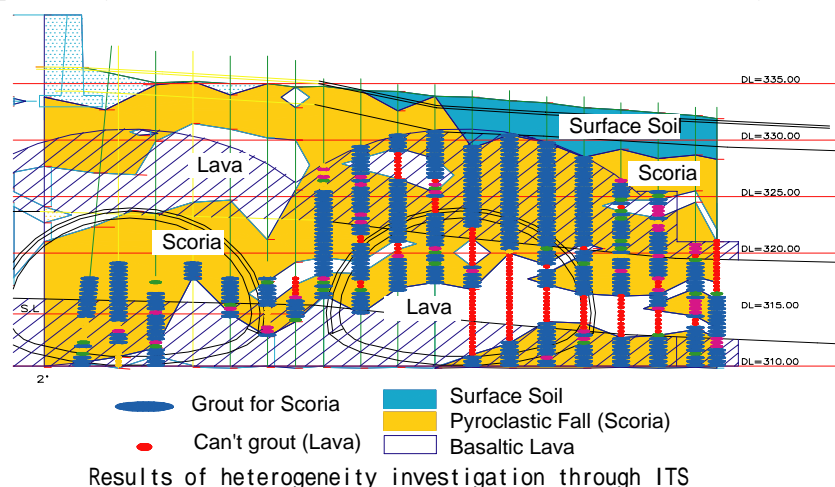
The Imazato Dai-ichi Tunnel is located at the south-eastern foot area of Mt. Fuji. Mt. Fuji is an active volcano dating back to the Quaternary period, which has ejected large amounts of lava rock and pyroclastic fall over the last 100,000 years. The strata of the tunnel site consists of alternating layers of basaltic lava, which is characterized by low viscosity and spreadability over a large area, and the pyroclastic deposits produced when eruptions from the crater fell onto the ground.

The tunnel is an eyeglass-type tunnel consisting of two large-section up-and-down tunnel in close proximity having three lanes each, with an extremely small overburden thickness of 7 to 15 meters to ensure structural stability.

The construction of this tunnel involves a large number of issues. These can be classified into issues related to the physical properties of ground subjected to tunnel excavation, issues related to the tunnel's structure, and issues related to the surrounding environment and construction work close to existing facilities. As these three factors are closely related to one another, it is difficult to discuss any of them on an isolated basis. This paper discusses these various issues and their solutions with particular focus on earth and geological materials and soil improvement.

Based on these various factors, the grouting method was employed. The grout material consisted mainly of cement. However, the heterogeneity of the voids in the target geological material having an enormous influence on cost and other construction factors, the authors proposed a system under which construction was carried out constantly checking the suitability of the grout material and the injection area against existing conditions, which ensured the efficient implementation of construction.

Due to the complex geology of the site, the Imazato Tunnel Sounding System (ITS), a strata judgment system that enables determination of the grouting range during grouting work, was developed. The introduction of the ITS system made it possible to determine the target grouting layer while drilling. Through the use of ITS, we were able to execute grouting only in the locations where it was required.



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