

## Relation between groundwater conducting fractures and subsurface geological environment in orogenic granitic rock

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Granitic bodies distributed in the orogenic belt forming the Japanese islands inevitably contain fracture and fault systems that act as groundwater conducting features. However, it is relatively little known about the detailed structural features relevant to the groundwater conductivity. In particular, controlling by grouting of highly conductive flow-paths in underground Liquefied Petroleum Gas (LPG) storage site is the technical basis to maintain the qualified water curtain system for the long-term safety LPG storage. Therefore, in order to understand the relation between structural feature of flow-paths and groutability, in-situ hydrological test and structural observation of pore geometry by over-coring after grouting of highly conductive flow-paths have been carried out during the construction of the LPG storage cavern at Kurashiki, Okayama Pref. Japan. Hydrological measurements and in-situ grouting revealed that planer type of single fracture and braded type of microfracture are the major conducting features in the granitic rock. Former is characterized by the traceable single fracture formed in the mylonitic zone readily sealed by grouting, and the latter is identical with microsheading like foliated network structure developed probably by unloaded tension stress field with very low groutability. Microscopic observation shows that both types of fracture contain the calcite as fracture filling suggesting in-situ open pore space, and pore geometry of conducting features strongly affects the groutability due to its connectivity. These distinguishable flow-paths structures can be considered as common conductive features in granitic rock formed in the orogenic belt and will be encountered in any other site of granitic rock for underground usage in Japan.