

雪山隧道工程與地下水之關係探討

許鈺漳

交通部臺灣區國道高速公路局

李懷淵 林賜忠 王進成

交通部臺灣區國道高速公路局北區工程處

摘 要

國道5號雪山隧道全長12.94km，穿越雪山山脈北段之地質破碎帶，地下水量相當豐沛；施工期間曾遭遇多次大量湧水，造成施工困難，前後歷經15年施工，最終於2006年6月完工通車。雪山隧道湧水問題向為各界關注之議題，特別是對於區域水文地質、翡翠水庫進水量與地表植被之影響等；以往研究雖已大致釐清其影響輕微，惟仍有賴營運期間長期監測數據佐證之。

本文首先說明雪山隧道工程與區域水文地質概要，其次援引以往相關研究成果之論據，闡述雪山隧道工程與地下水之關係；並整理雪山隧道自通車以來之歷年地下水流量監測數據，透過統計分析方式，評估雪山隧道地下水流量及其對鄰近環境的影響，接著並計算翡翠水庫歷年進水流量與其受隧道湧水量影響之比率。作者希望藉由本文進一步釐清雪山隧道工程與地下水之關係，提供作為雪山隧道後續維護或類似隧道工程之有益參考。

關鍵字：雪山隧道、地下水、隧道湧水、地下水流量監測。

Discussion on the Interaction of Hsuehshan Tunnel and the Groundwater

Cheng-Chang Hsu

Taiwan Area National Freeway Bureau, MOTC

Hwai-Yuan Lee Syh-Jong Lin Jin-Cheng Wang

Northern Region Office, TANFB, MOTC

Abstract

The 12.94 km long Hsuehshan Tunnel of the National Freeway No. 5, passing through the northern part of the Hsuehshan Mountains which distributed shattered fault, fractured zones, abundant of groundwater. This tunnel had been subject to groundwater inflow problems during the 15-years construction period. After the completion of the Hsuehshan Tunnel in 2006, the groundwater discharged from the tunnel and its impact on the environment has remained an important public issue. Although several relevant studies have been carried out to clarify the relationship between the Hsuehshan Tunnel and the regional groundwater, the long-term groundwater monitoring during highway operation is still required to better understand the tunnel-groundwater flow relation. Firstly, this paper briefly describes the Hsuehshan Tunnel and its hydrogeological condition. Secondly, the relation between the tunnel and the regional groundwater flow has been reviewed based upon previous studies, followed by the assessment of tunnel inflow and its impact on the adjacent hydrological environment. The monitoring data of the tunnel inflow during operation are then compiled through statistical analysis to assess its hydrological characteristics. Finally, the groundwater discharged from the Tunnel and the inflows of the Feitsui reservoir are compared to further clarify the environmental impact after the construction of Hsuehshan Tunnel.

Key Words : Hsuehshan tunnel, groundwater, tunnel inflow, groundwater inflow monitoring.