

# 曾文水庫防淤隧道工程大地工程設計及施工

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## 摘 要

曾文水庫為台灣庫容最大的水庫，並且與烏山頭水庫聯合運用供給嘉南地區灌溉及民生用水，是台灣南部最重要的水資源設施；水庫在莫拉克颱風(2009)事件中造成9千萬立方公尺泥沙淤積，並使壩前淤積高程達EL.176m以上，現有水庫底層放水口—永久河道放水口(標高EL.155.0m)及發電進水口(標高EL.165.0m)均遭掩沒，設施營運遭遇重大危機，水庫改建迫在眉睫。

為了使曾文水庫未來在遭逢颱風事件時，具有足夠的底層洩放口排砂，管理機關勢必需打設一條底層的防淤隧道，使得洪水所挾帶的底層渾水能適時洩放，但是在營運中水庫新建防淤隧道工程，將在進水口面對水庫蓄水位變化的挑戰，出水口接受水庫洩洪的考驗，以及地下開挖時因應水庫蓄水對於圍岩地下水的影響。

因此，本工程無論在進水口施工時所面對水庫蓄水的高水壓力、隧道開挖因鄰近水庫而產生的地下滲水、為洩放高壓射流而在出水口布置的大型地下消能洞室以及施工期間受水庫洩洪防汛作業的影響，均有別於一般隧道工程所受的挑戰與考驗，也賴大地工程人員審慎規劃設計與妥善施工。

**關鍵字：**水力排砂、防淤隧道、大型地下洞室開挖。

## Geotechnical Engineering Design and Construction of the Tseng-Wen Reservoir Sediment Sluicing Tunnel

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## Abstract

Tseng-Wen reservoir is the largest reservoir in Taiwan. It is used in conjunction with Wushantou reservoir to irrigate Chianan Plain, as well as supplying water for domestic and industrial water uses. Since Typhoon Morakot (2009), the reservoir has accumulated 90 million m<sup>3</sup> of deposit, with a deposit level at EL.176m. Bottom outlets – including the permanent river outlet intake (EL.155.0m) and the power intake (EL.165.0m) were all buried underneath the sediment to the detriment of its discharge capabilities and the performance of the reservoir.

In order to improve sluicing of the reservoir for possible typhoon or flood, the authority officials plan a sluicing tunnel to divert turbid water when necessary. The construction of a sluicing tunnel will potentially be influenced by the storage level of the reservoir, facing flood discharge problems as well as being affected by groundwater within adjacent bedrocks. In addition, foreseeable high positive water pressure at the intake area of the proposed tunnel, underground seepage during excavation, the construction of a large underground chamber for dissipation; as well as the effect of flushing or sediment routing in the outlet area during the construction stage of the project, are unprecedented engineering challenges. A concerted effort from all geotechnical engineers is therefore essential to ensure this project successful.

**Key Words :** hydraulic sluicing, sluicing tunnel, large chamber excavation.