中華水土保持學報, 37(3): 271-289 (2006)
*Journal of Chinese Soil and Water Conservation, 37* (3):*271-289* (2006)

# 鯉魚潭土石壩受到集集地震作用之動態反應分析

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**摘　　要**　本研究以有限差分法 FLAC5.0 程式進行鯉魚潭水庫土石壩受到集集地震作用之動態反應分析。鯉魚潭之壩高爲 96m。模擬鯉魚潭壩滾壓之築壩過程、土石壩滲流分析、滲流後之靜力平衡分析與最終之土石壩動態分析等一貫化分析。滲流分析係以集集地震來襲時的水位 60m 水位來分析。滲流分析後，再進行靜力平衡計算起始應力。在鯉魚潭壩因爲集集地震的垂直向震動明顯，故垂直向與水平向的加速度歷時均輸入至土石壩底部進行 50 秒的動態分析。地震加速度在輸入前先將高於 5Hz 的頻率濾除。動態分析的土壤模式採用等值線性的 FLAC 內建模式(Sigmoidal 4)與莫爾-庫倫模式加上 5%雷利式阻尼來指定。本研究數值分析所得壩體的加速度及其傅立葉頻譜與監測紀錄比較，且將壩頂與下游殼層的永久變形與測量資料比較後，存有差異，本文亦探討其可能產生差異的原因。本研究再以鯉魚潭壩受到集集地震分析結果爲基準案例，針對築壩材料的剪力模數對土石壩的動態反影響進行參數分析，其結果顯示剪力模數越大，壩體變形越小。

**關鍵詞：**土石壩、有限差分法、動態反應、等值線性、滲流分析。

# Analyses of the Dynamic Responses of Li-yu-tan Earthdam Subjected to Chi Chi Earthquake

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**ABSTRACT**　This study used FLAC5.0 to analyze the dynamic response of Li-yu-tan earthdam subjected to the 1999 Chi-Chi earthquake ($M_L$=7.3) in Taiwan. The dam is 96m high. The construction stage of the dam was simulated by 20 layers of the dam materials sequentially added up to the top. Seepage analysis was performed considering a 60-meter water level, which was the level when the earthquake struck. After the seepage analysis, the initial stress state of the dam before applying the earthquake was obtained by computation for static equilibrium. Because the vertical shaking of Chi Chi earthquake is notable, both the horizontal and vertical monitored acceleration time histories were input to the base of the dam for 50 seconds in the dynamic analyses. The frequencies of accelerations were filtered to be under 5 Hz before input. The FLAC built-in “Sigmoidal 4” linear equivalent dynamic model and Mohr-Coulomb soil model were simultaneously

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