

應用 HEC-RAS 快速模擬堰塞湖潰壩後之影響範圍

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摘 要 降雨或地震所引起的大規模崩塌如堆積於河道上，常形成堰塞湖，並可能於很短的時間內潰決並對下游造成災害。依據統計資料顯示，約有 50% 的堰塞湖於形成後的 10 日內潰決，因此如何快速評估堰塞湖潰決後之影響範圍及可能造成之衝擊，係防災期間重要的決策依據。本研究使用 HEC-RAS 的二維洪水演算模組，並以 2020 年發生於花蓮舞鶴的玉里 21 林班地大規模崩塌為研究對象，由崩塌的土體配合當地 DEM 數值資料分析，推估可能的壩長為 90 公尺、壩寬 40 公尺、壩高 30 公尺，並以花蓮舞鶴村水文監測站於 2016 年的莫蘭蒂颱風期間的 2 倍降雨，模擬該處如形成堰塞湖並潰決後可能帶來的衝擊。結果顯示，HEC-RAS 的二維洪水演算可完整模擬潰壩時所產生之潰決尖峰流量、洪水到達時間、河道溢淹的情況等，其成果可供防災單位進行情境想定與避難規劃等參考。

關鍵詞：堰塞湖、HEC-RAS、潰壩模擬。

Application of HEC-RAS for Quick Simulating The Influence of Landslide Dam after Dam Failure

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ABSTRACT This Large-scale collapses caused by rainfall or earthquakes usually form landslide dam if they accumulate on the river. Dam failure may occur in a short time and impact downstream. According to statistics, about 50 percent of landslide dams collapsed within 10 days after formation. Therefore, how to access scope of impact and the possible damage quickly after a dam failure is an important basis of decision during disaster prevention. This study uses the two-dimensional flood calculation module of HEC-RAS, and takes the large-scale landslide of Yuli NO.21 National Forest in Wuhe, Hualien in 2020 as research object. With the collapsed soil volume and digital elevation model data in local, we estimate the reasonable dam length is 90m, dam width is 40m and dam height is 30m. Using the double rainfall of hydrological monitoring station in Wuhe, Hualien during Typhoon Moranti in 2016 to simulate the formation of landslide dam and the possible impact of dam failure. The result shows that the two-dimensional flood calculation module of HEC-RAS can completely present the peak flow, flood arrival time, the overflow of river, etc. after dam failure. The result can be used as a reference for agency of disaster prevention for situational simulation or evacuation planning.

Key Words : landslide dam, HEC-RAS, dam failure simulation.

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