格框工孔洞設計對削減水流能力之影響

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摘　要　莫拉克颱洪事件後，卑南溪不論於高水或低水流況其水位與流速均呈上升趨勢。本研究於卑南溪監測水深變化，顯示主流路集中於河道凹岸，且水深明顯大於凸岸或鄰近灘地水深，且其流速亦相對較高。潛在破壞堤段區流速約在 8 m/s-10 m/s；低水流況下，主流路均集中於深槽，流速約 7 m/s，顯示高水流況下河段流況較劇烈。若以平常格框工之設計參數為例 (填充塊石之直徑為 20 cm，平均坡降 0.007 與曼寧糙度 0.038)，此設計已不敷使用於卑南溪高流況之潛在堤段破壞區。由於流速過快，格框護腳工之填充材料欲產生護甲作用，依掃流破壞安定分析公式計算，其直徑需大於 8 m 以上，建議改以混凝土塊代替，較能確保設施安全。

關鍵詞：莫拉克颱風、格框工、孔洞設計、掃流破壞。

Effects of Holes Design of Gridiron-Groyne on Deflecting of Flow Velocity

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ABSTRACT After Morakot Typhoon flooding event, the water level and the flow velocity increased in Beinan River, which reflected siltation of the river bed. The monitor results revealed that the Froude number (NF) exceeded 0.8 in most of river sections, high flow velocity was about 4m / s ~ 8 m/s, and low flow velocity was about 3m/s ~ 6m/s. Along the Beinan River, water depth at concave bank sides was significantly greater than that at the convex bank side. Besides, water flow velocity was also higher at concave bank sides than in the convex side. Therefore, if the stone with 20 cm in diameter is filled in Gridiron- Groyne, and average gradient of 0.007 and Manning roughness of 0.038 are also considered; the maximum tolerated flow rate for cross-flow destruction is therefore 5.37 m/s. However, the average flow rate of Beinan River has found to exceeded 5.37 m/s, and concrete blocks are recommended and the size of those blocks should be over than 26 m in diameter. The blocks are also recommended to connected together to ensure the safety of facilities in river.

Key Words : Morakot Typhoon, Gridiron- Groyne, holes design, sweep stream destroy.

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