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石門水庫集水區泥砂治理之成效評估

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摘　　要　台灣水庫嚴重淤積問題乃肇因於崩塌與開發不當等因素，雖然水庫可藉由清淤與水質改善等方式延長使用壽命，但都遠不及集水區泥砂治理工作來的有效，因此水庫集水區的經營與水土保持措施之成效評估更顯重要。有鑑於此，本研究乃利用整治率之概念進行集水區泥砂治理成效之評量，以具體反應水庫集水區土砂管理與保育工作之效益，期能提供一簡易可行之方法以供參考。本研究整理石門水庫 1964 年至 2005 年之歷年淤積量測資料，可知颱風豪雨常是造成石門水庫土砂災害的主因，經由長年來集水區泥砂治理工作之持續進行，石門水庫之年淤積量已由早期 400 萬 m^3 降爲 140 萬 m^3，研究結果顯示，歷年來石門水庫經營管理與水土保持工作之治理成效大致延長水庫壽命達 60 年，在將近 8000 萬 m^3 的土砂整治成效中，歷年防砂壩之總防砂量即達 4000 萬 m^3，而集水區之整治率更逐年升高，惟因數次颱風引發水庫淤積量攀升，致使整治率下滑，尤以艾利風災後所引發土砂災害問題大幅降低整治率成效，必須藉由再次投資整治以恢復集水區原有之整治率成效狀態。

關鍵詞：石門水庫、泥砂、整治率、泥砂減淤。

Evaluation of Sediment Management in Shihmen Reservoir Watershed

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ABSTRACT　Serious siltation of Taiwan's reservoirs has occurred from natural landslides and over-development. Although reservoirs can be dredged to prolong their utility and there are treatments to improve water quality, it is far better to achieve these goals via effective watershed sediment management. In order to assess the effectiveness of reservoirs management plans and watershed conservation work, this study uses the concept of completeness ratio to apply the evaluation model of watershed sediment management in planning and evaluating reservoir conservation; and it should be a practical and convenient method in the future. The sedimentation records and watershed conservation work of the Shihmen reservoir from 1964 to 2005 are used for analysis. Torrential rains accompanying the typhoon induced severe sediment problems in the Shihmen reservoir. After long-term watershed sediment management, the annual sediment yield in the Shihmen reservoir reduce from $4.0\times10^6 m^3$ to $1.4\times10^6 m^3$. Results show that the step up of the Shihmen

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reservoir's lifespan is about 60 years for the reason of the effectiveness of both the long-term reservoir management plans and watershed conservation works. Total quantity of sedimentation reduction is about $80\times10^6 m^3$ before 2003; meanwhile, the deposition of check dams is around $40\times10^6 m^3$. Additionally, it is found that the completeness ratio of the Shihmen reservoir is soaring as time goes on. Besides, the completeness ratio is also alighting during typhoon events, Typhoon Aere (08/23/2004～08/26/2004) especially. According to the variations based on the sediment yield and typhoon events, the results also present the rising on the completeness ratio with the increasing investment on the management.

Key Words: shihmen reservoir, sediment, completeness ratio, sedimentation reduction.