

高屏溪攔河堰流量與懸移質泥砂濃度及濁度關係研究

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摘 要 流量、懸移質泥砂濃度觀測資料對於各種水資源、水利規劃課題及數值模式或物理模式而言，為極重要之水文觀測資料，但因泥砂濃度自動化觀測不易，人工採樣觀測耗時、耗費較多，故懸移質泥砂濃度資料累積較為不易。水體濁度由於為生態環境、自來水公司取水水質之重要判別指標，濁度自動化監測儀器之發展較為成熟，適合佈設於河川現地進行長期監測紀錄。近年來高屏堰受到連續颱風豪雨侵襲，造成高屏堰進水口及活動堰嚴重淤積，取水困難，又由於洪水期間原水濁度升高，造成原水濁度過高、處理困難影響大高雄地區民生用水之供應。因此，若能建立懸移質泥砂濃度與濁度之關係式，可藉由現地佈設之濁度監測，即時獲得水體濁度變化，並可推估懸移質泥砂濃度變化情形，以提供管理單位提早掌握高屏堰原水懸移質泥砂濃度、沖淤變化情勢，增加取水應變措施時間。本研究結果顯示，高屏堰流量、懸移質泥砂濃度及濁度變化相互間之率定關係良好，相關係數皆達 0.89 以上，對於參數間之轉換推估應用有相當的助益。

關鍵詞：懸移質泥砂濃度、濁度、濁度計、微波杜普勒測速儀。

Characteristics of Discharge, Suspended Sediment Concentration, and Turbidity at the Gao-Ping River Weir

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ABSTRACT Hydrologic records of monitored streamflow and suspended sediment concentration (SSC) are essential to numerical and physical models, as well as to planning hydraulic and water resources projects. Because automated SSC monitoring has its technical difficulties and manual collection is time-consuming and expensive, it has been a challenge to accumulate SSC records. On the other hand, collection of water turbidity records, widely used as the indicator for environmental pollution and for water intake decisions by water companies, has developed well-established automated methods. It is therefore applicable to monitor turbidity at streams for long term data collection. Despite the different physical definitions of SSC and turbidity density, in practice SSC and turbidity can be interchangeable through rating and regression analysis. In recent years, the Gao-Ping river weir has undergone consecutive typhoons and torrential rainstorms,

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which in turn resulted in severe sedimentation at the entrance of water intakes and the movable weir, making it particularly difficult for water intake. Elevated turbidity during floods also compromised the ability of the Water Company to effectively and timely treat the water to meet the domestic water demands from residents of the greater Kaoshiung area. Therefore, if an SSC and turbidity relational model can be established, one can timely estimate the changes in SSC through the real time on-site monitored turbidity. Such a tool can allow the water managing agency sufficient time to monitor changes in SSC and bed erosion or deposition, and enough lead-time to react to water-intake operations. This study has showed good rating relationships among flow discharge, SSC and turbidity at the Gao-Ping river Weir, with the correlation coefficient being ≥ 0.89 , reflecting high confidence in the interchanging relations of these parameters.

Key Words: suspended sediment concentration, turbidity, turbidimeter, micro wave Doppler current meter.