

國立中興大學水土保持學研究所碩士論文

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大甲溪上游七家灣溪及雪山溪推移質推估
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本文以大甲溪上游七家灣溪及雪山溪於64年貝蒂颱風、65年畢莉颱風、66年薇拉颱風與愛美颱風期間，溪床沖淤之變化，由野外施測取得實測值。同時以蕭克立胥公式、佐藤、吉川、芦田公式及梅彼慕公式與愛因斯坦公式簡化法，並使用個別粒徑法進行理論值估算。

水流中泥砂之輸送受流量、流速、水深或水力半徑之支配。由於資料缺乏，乃以七家灣水文站進行水文分析，導出無因次單位歷線，由此推得各控制斷面之流量歷線，供各公式估算推移質輸砂量之用。

為使估算能與自然情況較為接近，各控制斷面皆定於溪床土。使用電腦估算之結果，蕭氏公式顯然表現泥砂輸送特性，其推移量亦較接近實測值。其餘諸公式之估算值皆趨近於零，無法表現泥砂之推移量。此外，由個別粒徑法所得之量約為規定粒徑法之1.47至4.15倍。

由推估之結果得結論如下：

1. 在七家灣溪及雪山溪估算推移質輸砂量，本文選用四種公式中，以蕭氏公式較佳。
2. 若為保守估算，以蕭氏公式個別粒徑法為合適。
3. 水文分析於資料不甚充足地區應側重之。

由於受到基本資料之限制，無法作進一步之分析。同時限於設備，欠缺模型試驗之配合。然進行泥砂研究，此二者皆需重視之。

ABSTRACT

The variation of channels at Chi-Chia-Wan and Sheh-Shan streams which are the up-stream branches of Ta-Chia stream caused by four storms was surveyed in order to calculate the quantities of sedimentation. The four storms are Betty Typhoon (1975), Billie Typhoon (1976), Vera Typhoon, and Amy Typhoon (1977). The formulas of Schoklitsch, Sato-Kikawa-Ashida, simplified Meyer-Peter & Müller and simplified Einstein were used to compute the bed load discharges. In addition, the " Individual Grain Size Technique " was used.

The sediment transport is affected by discharge, velocity, hydraulic radius and/or depth. For the lack of some basic hydraulic parameters, the dimensionless unit graph at Chi-Chia-Wan Hydrometric Station was derived. The unit graphs and hydrographs of all control sections were developed with the dimensionless unit graph. Using those hydrographs and formulas, bed load discharges were computed by a FORTRAN IV program.

All the control sections were selected on the natural bed to let the computation be as nearby as natural conditions. It was found that the Schoklitsch formula was the best one to compare with the surveyed quantities. The computed quantities of the other formulas all approach zero. In addition, the ratios of computed quantities between Schoklitsch formula using individual grain size technique and Schoklitsch formula without using individual grain size technique ranged from 1.47 to 4.15.

The conclusion can be drawn as follows:

- (1) To estimate the bed sediment transport of Chi-Chia-Wan and Sheh-Shan streams, Schoklitsch formula was found to be the best one among the four formulas used.
- (2) The individual grain size technique applied in Schoklitsch formula was found on safe side when used in those watersheds.
- (3) The hydrograph analysis is very important for those areas which lack of basic hydraulic parameters.