# 草溝實驗及設計之研究

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**摘　　要**　近年來注重環境生態的保育，非主要排水設施若以草溝取代，可降低整體排水系統混凝土的使用量，並易於與自然環境結合。爲尋求合適之草溝鋪設排水設計，本研究以三種草種及三種渠槽坡度進行渠槽實驗，擬針對草溝之水理設計進行分析、探討。經實驗結果驗證許（2003）理論解，並找出三種草之草高與孔隙率之關係，進而繪出不同坡度下，相對深度與平均流速之關係圖。但因其解假設條件爲無限寬敞的渠道，而一般草溝設計則常用拋物線形斷面，本研究利用 Hey（1979）找出修正形狀因子之係數，可應用於設計草溝之水理分析。文中提供設計例並與傳統上採用曼寧公式之方法進行比較，結果發現曼寧公式所求得之流速皆偏大，顯示其應用於斷面設計時容易比真實情況高估。

**關鍵詞**：渠槽試驗、植生渠道、曼寧粗糙係數。

# Study of Hydraulic Experiment and Design in a Vegetative Channel

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**ABSTRACT**　　Nowadays, in order to protect the ecological environment, the proportion of concrete used to construct drainage facilities should be reduced, and some non-major drainage facilities could be replaced with grassed channels. The experiment for verifying theory developed by Shiu's (2003) was executed with three kinds of grass and three different flume slopes to analyze the design of grassed channels. The results of this study support the analytical solution of Shiu (2003). This study also builds on the relationship between the height of grass and its porosity, and then plots the relationship between the relative height and the mean velocity for three kinds of grass under different slopes. Since the analytical solution was derived under the condition of an-infinitely wide slope, the shape of parabolic sections of general grassed channel needs to be considered. This work uses the results of Hey (1979) to build the shape factor, which can be used to design a grassed channel with a parabolic section. We provide a design case to compare with the application of Manning's formula. It indicates that the design of drainage facilities by Manning's formula is often different from reality.

*Key Words:*　flume test, grassed channel, coefficient of Manning's roughness.

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