

## 旋杯式與旋槳式流速儀觀測特性分析研究

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**摘 要** 台灣河川具有流域狹小、河流密集、坡度陡峻、沖刷及淤積情形嚴重與洪枯流量懸殊等特徵，使得在水位、流量觀測上，面臨洪峰歷程短、洪峰流量觀測捕捉不易，流速較高、水面波動大、斷面變化過於迅速，以及洪枯流量觀測條件差異等挑戰，使得流量觀測一直是台灣水文技術上亟待突破之課題。同屬轉子型式之旋杯式及旋槳式流速儀，因流速儀率定容易，觀測可靠度高，觀測精度具一定水準，儀器價廉，機械結構堅固、簡單，操作維護容易等優點，所以為國內外最早廣泛使用的河川流速儀。本研究擬分別針對旋杯式流速儀與旋槳式流速儀，依據 ISO3455 規範進行校正試驗工作，並對量測值進行迴歸分析、器差分析及不確定度分析。歸納評估此兩種常用轉子式流速儀之器差及不確定度分析差異，可明顯看出旋杯式流速儀在流速低於 0.5m/s 條件下之靈敏度及器差表現皆較佳；旋槳式流速儀則在流速高於 0.5m/s 條件下有較佳表現。

**關鍵詞：**轉子式流速儀、不確定度分析、器差分析、率定關係。

## Measuring the Performance of a Price and Propeller Current Meter

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**ABSTRACT** Streams in Taiwan are characterized by narrow and small drainage areas, higher drainage density, steep longitudinal slope, severe scouring and deposition, and extreme stream flows between dry and wet periods. These characteristics cause frequent scouring and deposition in the riverbed, rapid changes in cross sectional geometry, and other factors, that result in difficulties for stage and discharge measurement. This is a key issue in promoting the velocity measurement technique. The Rotator Type current meter is popular in water resources engineering, because it is more robust, reliable, precise, easy to operate and calibrate, and less expensive. The study took the popular flow velocity measuring equipment, Price AA and Propeller Type current meter, according to ISO3455, to apply correction tests. Laboratory testing of the meters including linearity testing and repeatability testing was performed in the calibration system. The regression analysis, measurement instrument error analysis and uncertainty analysis had been carried out. All meters tested had good linearity of response and

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fair repeatability. It was found that the performance of sensitivity and instrument error of Price current meter were better than the Propeller Type current meter at a lower velocity of less than 0.5m/s . And the performance of sensitivity and instrument error of the Propeller Type current meter were better at a higher velocity of more than 0.5m/s.

**Key words:** rotator type current meter, uncertainty analysis, instrumental error analysis, rating relation.