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A study of the river velocity measurement techniques and analysis methods

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Velocity measurement technology can be traced back to the pitot tube velocity measurement method in the 18th century and today's velocity measurement technology use the acoustic and radar technology, with the Doppler principle developed technology advances, in order to develop the measurement method is more suitable for the measurement of velocity, the purpose is to get a more accurate measurement data and with the surface velocity theory, the maximum velocity theory and the indicator theory to obtain the mean velocity. As the main research direction of this article is to review the literature of the velocity measurement techniques and analysis methods, and to explore the applicability of the measurement method of the velocity measurement instruments, and then to describe the advantages and disadvantages of the different mean velocity profiles analysis method. Adequate review of the references of this study will be able to provide a reference for follow-up study of the velocity measurement. Review velocity measurement literature that different velocity measurement is required to follow the different flow conditions measured be upgraded its accuracy, because each flow rate measurement method has its advantages and disadvantages. Traditional velocity instrument can be used at low flow and RiverRAD microwave radar or imaging technology measurement method may be applied in high flow. In the tidal river can use the ADCP to quickly measure river vertical velocity distribution. In addition, urban rivers may be used the CW radar to set up on the bridge, and wide rivers can be used RiverRAD microwave radar to measure the velocities. Review the relevant literature also found that using Ultrasonic Doppler Current Profiler with the Chiu's theory to the velocity of observing automation work can save manpower and resources to improve measurement accuracy, reduce the risk of measurement, but the great variability of river characteristics in Taiwan and a lot of drifting floating objects in water in high flow, resulting in measurement automation work still needs further study. If the priority for the safety of personnel and instruments, we can use the non-contact velocity measurement method with the theoretical analysis method to achieve real-time monitoring.