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TURBULENT FLOW CHARACTERISTICS IN THE ERODED REGION OF THE SIDE-WALL BANK

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Abstract

An experimental inquest was performed to quantify the turbulent flow characteristics near the eroded region of an artificial side-wall bank at three different flow depths, and a comparison study is made between before and after erosion for two Reynolds numbers. Instantaneous flow velocities were taken with an acoustic Doppler velocimeter (ADV) at near bank of the vertical side wall. The mean flows and other turbulence quantities such as Reynolds shear stress, turbulent intensities, and turbulent kinetic energy for two Reynolds numbers are discussed. Turbulence strength (Reynolds shear stress and turbulent intensities) are maximum at the eroded region of bank wall. The paper described the fractional contributions of ejection-sweep cycles to the stress and timescale of occurrence of ejection-sweep events at the eroded region. The probability density function of the velocity fluctuations provides information on the direction of the transportation of the turbulent energy, which is responsible for removal of bank material.

Key words: bank erosion, bursting events, cohesive sediments, Reynolds shear stress, turbulence

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