Experimental Study on Flow Characteristics in a Bend with Multistage Spur Dike

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Under the regulation of multistage spur dikes, the water flow structure of river channel will change greatly. In this paper, by using particle imaging velocimetry(PIV) system and through indoor bend flume experiments, the water level along the bend under, the lateral ratio drop (Jy), the longitudinal ratio drop(Jx), the longitudinal velocity along the way, the longitudinal turbulence intensity(Tux) and the Reynolds stress(ReT) are measured and analyzed in the laboratory. The results show that: ①The water level at the concave bank in the curved channel shows the trend of rising-falling-rising, while it shows the trend of falling-rising at the concave bank. ②Jy increases first and then decreases, which is closely related to the grades of spur dikes; Jx first increases and then decreases, and finally approaches 0, and the changing of the stages of the spur dike has little effect on Jx; ③ The longitudinal flow velocity along the convex bank is increasing first and the declining, and the opposite is true for it near the concave bank. ④At the upstream of spur dike, Tux decreases first and then increases with the increase of relative water depth z+, and at the downstream of spur dike, the changes of Tux in different working conditions with the change of z+ are distinctively different. ⑤At upstream concave bank, ReT is distributed in "S" shape along vertical line, and ReT increases with z+ increasing at convex bank. The distributions of ReT  at the downstream along a vertical line of different working conditions are entire different.