

Experimental and Theoretical Study on Opening Angle of Automatic Flap Gate

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The opening angle of automatic flap gate is affected by the water level difference between upstream and downstream. However, flood control has a considerable impact on the opening angle and sediment balance of the gates. The amount of sediment contained in the drainage downstream can cause erosion and accumulation on the coast. In addition, the opening angle of gate is also a major factor to ensure the upstream ecology of migratory fish in river. This study used hydraulic experiment to discuss the relationship between the flow of flap gate, opening angle and water level in front of the gate. The change of opening angle and moment balance analysis was discussed in the free flow condition. In this study, the gate moment analysis uses the momentum equation to estimate the pressure of the flow on flap gate. It was showed that the material changes in the weight of the flap gate will result in different opening angles. In the free flow the opening angle and unit area are in direct proportion. It proves that the momentum equation can estimate the force balance of the flap gate. Through the analysis of the discharge of flap gate and related factors, the moment balance between the hydraulic force and the gate will benefit design and analysis of flap gate in practice for the future.