



Experimental Study on the Hydraulic Desilting System of Dam Farm Pond

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Due to the effects of extreme climate, the frequency of drought has increased around the southern Taiwan in recent years. The development and utilization of water resources, especially in dry season, becomes more significant in the hillsides of southern Taiwan. Farm ponds are useful facilities for agriculture, especially in the hilly areas. In addition, farm ponds can provide the functions of water retention and detention, ground water recharge, land subsidence mitigation, water purification, ecological conservation and habitat environment. According to the results of fieldwork, about ten percentage of ponds are facing more serious sedimentation problems. Among these farm ponds, deposition in dam farm ponds may be more severe. Because the farm ponds are located on hilly areas where agriculture is active, the problem of sediment deposition is always issued. This study used an experiment model to study the feasibility of hydraulic desilting of dam farm pond. The experimental study was conducted in a tank of cube which has a volume of 1.0 m³, a stand pipe area of 0.01 m², an inclined pipe area of 0.01 m² and desilting pipe diameter of 0.03 m. The experimental arrangements included three positions of desilting pipes (setting0, setting1, setting3), two bottom orifice sizes ($D_o = 1.0$ cm, 2.0 cm), three sediment deposition depths (EL = 30 cm, 40 cm, 50 cm) and three water levels (WL = 60 cm, 70 cm, 80 cm). Our study aims to figure out the most effective sediment removal ratio in the different arrangement of experiment. The inflow discharge varied from 450 to 4,000 cm³/s. The median diameter (d_{50}) of the sediment used in experiments was 0.12 mm. According to the results of experiment, sediment removal ratio with bottom orifice of 2.0 cm is higher than bottom orifice of 1.0 cm under conditions of three different sediment deposition depths and three different water levels. The experimental results indicate that desilting pipes installed in the dam farm pond is helpful for removing sediment deposition. This study will also conduce to the promotion of conservation measures and water resources that related to farm ponds.