

SIMULATION OF XIAOLANGDI RESERVOIR SEDIMENTATION AND FLUSHING PROCESSES

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Abstract Xiaolangdi Reservoir is located at 40km north of Loyang and 128.42km downstream of the Samenxia Reservoir on the main stem of the Yellow River in China. Sedimentation mechanism of the reservoir is very complicated because of high sediment concentration, tributaries, and rapid change of water surface elevation. GSTARS3 computer model was selected and modified to simulate the Xiaolongdi Reservoir sedimentation and flushing processes. Non-equilibrium sediment transport equation was activated in GSTARS3 to simulate spatial and time delay effects of sediment transport. Previous studies suggested the use of a constant recovery factor. This study indicates that the variation of the recovery factor is a function of sediment size. Simulated results using GSTARS3 with Yang et al (1996) modified unit stream power formula for high-concentrated sediment laden flow and non-equilibrium sediment transport equation agrees well with surveyed reservoir bed profiles, size distributions of the bed material, and volume of sediment sluiced out from the Xiaolangdi Reservoir.