University of Zabol

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(in the field of Hydraulic Structures Engineering)

Simulation of Sediment Entry into Two Intake Canals of

Chahnimeh Reservoirs Using HEC RAS

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Abstract

Dam reservoirs are built to store water for downstream uses, flood control, energy generation and recreation. The most important factor determining the useful life of intake canal of out of flowpath reservoirs is achieving the mentioned goals. Sistan plain in the southeast of the country has an unfavorable and dry climate that is heavily dependent on incoming water to supply for its agricultural water, and on the other hand, the development of the plain is highly dependent on chahnimeh reservoirs. HEC RAS model is a well-known one-dimensional application in the field of flow and sediment simulation. In the present study, the mathematical model of HEC RAS 6.0.0 was used to perform flow deposition calculations related to the flood hydrograph in 2006-2007 in two intake canals of feeder No. 1 and feeder No. 2 of chahnimeh Sistan reservoirs. Flow simulations were performed quasi-continuously using the standard step-by-step method. Using the simulation results of HEC RAS 6.0.0 model, sedimentation in two water supply canals of chahnimeh Sistan reservoirs was analyzed. After calibration and hydraulic and sediment validation of the flow, simulations were performed in four scenarios. The results of this study show that in the conditions of maximum water level of chahnimeh reservoirs, feeder channel No. 1 in spite of sedimention along the canal, has the ability to pass flow and sediment. Average changes in the length of the longitudinal bed of feeder channel No. 1 are equal to 1.47 meters and the volume of sediment in this channel is 271 thousand tons while in this condition feeder channel No. 2 has a 48% increase in longitudinal bed level and 87.8% more sedimentation volume than feeder channel No. 1. In the case of minimum water level of chahnimeh reservoirs, bed of feeder channel No. 1 has erosion and average changes in the longitudinal bed level of feeder channel No. 1 are equal to -1.40 meters and the volume of sediment in this canal is -354 thousand tons. In the same case, in the bed of feeder channel No. 2 sedimentation has occurred and average changes in the length of the longitudinal bed of the canal were equal to 1.05 meters and the volume of sedimentation was equal to 1.6 million tons, which shows the poor performance of feeder channel No. 2 compared to feeder channel No. 1. Finally, it is recommended to use feeder channel No. 1 compared to feeder channel No. 2 In both cases of maximum and minimum water level of chahnime reservoirs due to its better sediment performance in water supply