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# Filtration in the earth-fill dam in reservoir hydrosystem

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Field studies were carried out on the earthen dam of the channel reservoir of the Tuyamuyun hydrosystem on the Amudarya River (Uzbekistan), which was put into operation in 1984 according to the traditional method using control and measuring equipment embedded in the body of the dam. The water levels of the upper and lower reaches, piezometers, and drainage water discharge were measured. Maximal water levels of 130.00 in the head race were observed in the middle of October and minimal levels of 117.00 in March. Water levels in the tail race depend on the amount of discharge water through the hydrosystem. The maximal level in the tail race for 2019 was 112.82 m. (01.05.2019) at the discharge rate of 1200 m<sup>3</sup>/sec. A minimal level of 109.78 m at the tail race was observed on 07.11.2019 at a discharge rate of 150 m<sup>3</sup>/s to the tail race through the hydrosystem. The rising tendency of the bed level at the tail race was found out. Channel water reservoir filling and draw-off plots were constructed, which show that they reached the values of up to 3.10 m/day and 2.0 m/day, respectively. These values are 3 and 4 times higher than the allowable values of 0.5 m/day and 1.0 m/day. Out of 53 piezometers, 34 are in working condition; the rest are filled with sediment and need flushing. The difference in water levels downstream in 2014 and 2019, with a flow rate of 150 m<sup>3</sup>/s, is 0.74 m and at 1100 m<sup>3</sup>/s is 1.37 m. Constructed plots of water level change in piezometers show that they react to water level change in channel water reservoir delaying by 15-20 days on average. On the whole, the phreatic line in the field is

located below the design line. Maximal filtration discharge is 32 l/s at the water level of 130.00 at the head race. No-34 out of No-53 piezometers are in working order; the rest are silted up and require washing. The plotted graphs of changes in water levels in piezometers show that they react to changes in water level in the channel reservoir, lagging on average by 15-20 days. In general, the natural depression curve is below the design one. The maximum filtration flow rate was 32 l/s, with a water level in the upper pool of 130.00.

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