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SOME DESIGN ISSUES AND CONSTRUCTION OF EMBANKMENT CANALS CONSTRUCTED WITH SOIL DUMPED INTO WATER

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Abstract

The article is devoted to the study of the work of monitoring changes in the mineralization of the water of the Amu Darya River within the Karakalpak Republic. The operation of the water supply system is described in stages and analyzed.

Keywords. Hydrogeological, hydrographic, unsuitable, reservoir, accumulations, corrosion

Introduction

This article discusses some issues related to the design and construction of embankment canals built in earthen soils, which are widely used in flat conditions of irrigated agriculture. The territory of the lower reaches of the Amudarya River is characterized by a pronounced, often shaped topography with a large number of closed depressions, quite large in size in plan. Therefore, most of the irrigation canals of Karakalpakstan, to ensure command over the irrigated areas, bypass the lowest points of depression along its slope, forming an oblique mountainous section. All this creates greater tortuosity of the channels in plan, increasing their length and, accordingly, water losses due to filtration.

Therefore, when reconstructing canals, it is advisable to straighten their dynamic axis in plan and build dams of the required height along the straightening route. Practice shows that the construction of such sections of canals in conditions of finesandy soils causes rapid sedimentation, bottom rise, as well as some narrowing of the channel due to sediment deposition on internal slopes, while the stability of the dams increases and filtration losses decrease. Based on the research conducted and generalizations of available experimental data, a list of indicators for the use of water resources and a methodology for their analysis have been developed.

The design and construction of bulk earthen channels, traced in easily eroded non-cohesive soils, passing in dams, taking into account the patterns of channel processes characteristic of natural rivers, responding to the uneven flow of liquids, further complicates their hydraulic calculations, which require generalization of the results of theoretical, laboratory and field studies, dedicated to channel beds of dynamic equilibrium.

The dynamic stability of earthen channels is characterized by the balance of sediments entering a given area of the bed and carried away from it, that is, in the presence of soil exchange between the stream and the channel up to the maximum possible sediment load of the stream [1].

Observations have established that an increase in the sediment load of a flow beyond the maximum possible for the same water flow leads channels to a qualitatively new stage of channel formation - the stage of curvilinear channels, characterized at the beginning by the curvature of the dynamic axis of the flow, and then the channel itself, then by the formation of meanders, division of the watercourse on sleeves, etc. Therefore, when designing such channels, it is necessary to carry out calculations using the equations of uneven fluid flow.

According to field studies, the profile of a spit that is resistant to erosion should take into account, on the one hand, the impact of turbulent flow, and on the other, the strength properties of soils (angle of internal adhesion friction).

Specially conducted turbulence experiments in a given flow area determined the force effects on particles or soil aggregates that play the longitudinal component of the pulsation at a given speed. The complexity of the phenomena occurring in a given layer of flow during the flow around particles or soil aggregates makes it difficult to analyze stability and therefore consideration of the averaged picture of the phenomenon seems reliable.

The construction of bulk earthen channels is carried out in half-embankments - half-excavation or completely in the embankment, then the dams that form its profile are designed similarly to earthen dams (Fig. 1).

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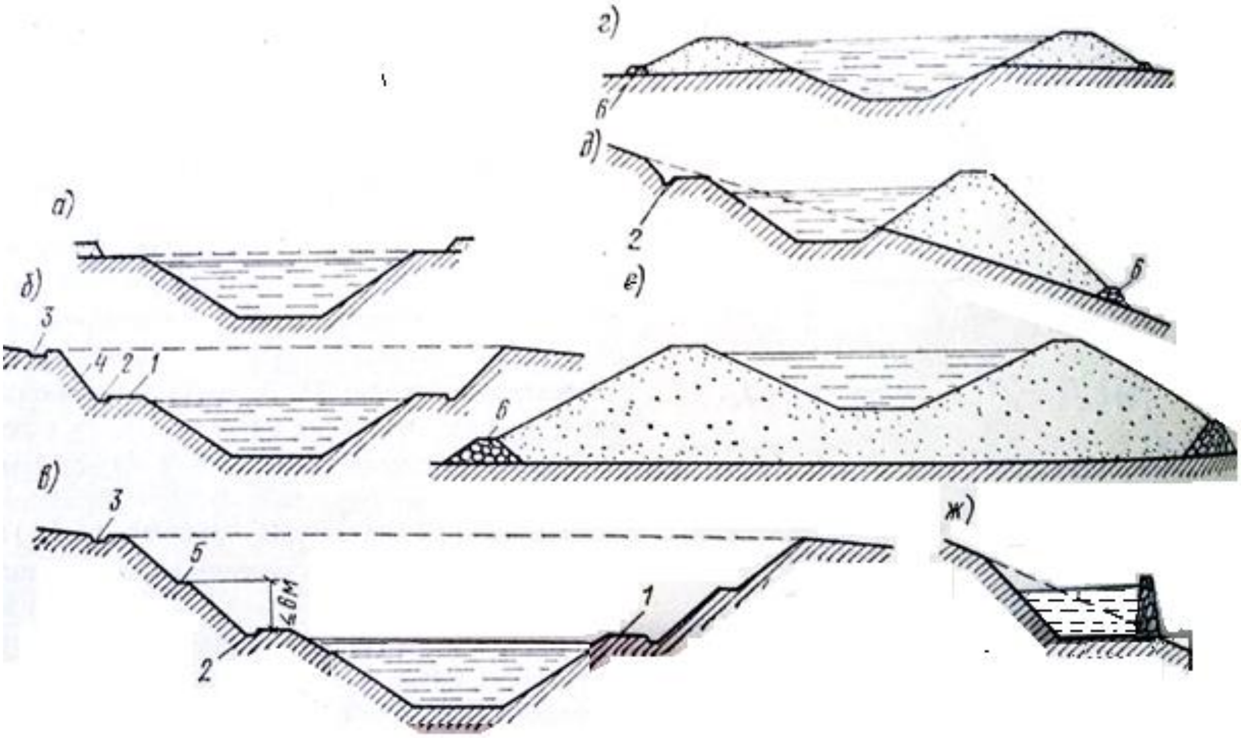

Fig. 1. Cross sections of channels
а – в – in recesses of various depths; г – д – в - in a half-embankment-half-cut; е – in the embankment; ж - on a slope; 1 – berm; 2 – cuvette; 3 – upland ditch; 4 – dry slope; 5 – intermediate berm; 6 – drainage.

The width of the dam crest is taken to be at least 2.0 m. If necessary, by elements. The methodology for calculating extremely stable slopes in dams constructed by various methods (hydraulic and mechanical), proposed by many scientists, has been reviewed and analyzed by us, some theoretical and practical features have been noted for two conditions of work: the initial period of dam construction and the period of completed soil deformation, estimated based on These conditions correspond to the developed methods for calculating the stability of embankment channels.

Thus, it is advisable to design and build artificial canals running in embankments in the conditions of the Amudarya River delta with given (measured) sections and formed narrowed stable channel, using soil for embankment of dams from internal reserves, which has a positive effect on the reconstruction of irrigation canals and creates favorable conditions for cleaning the riverbed and repairing dams.

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