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GENERAL INFORMATION ABOUT WATER INTAKE FACILITIES . CONDITIONS AND CLASSIFICATION OF WATER INTAKE

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Abstract. The article provides information on water intake structures used in the water management sector and information on water intake structures currently used in water management. The location of water intake structures is discussed in detail.

Keywords: *hydraulic engineering, hydraulic unit, reservoirs, dams, pumps, water intake, aquifers, sediments.*

Understanding of water intake. Water sources used for agricultural and drinking purposes are diverse, including reservoirs in rivers, rivers and streams, ponds, ponds, etc. When water is taken from each source, the water receiving structure is equipped with a device or device, and it transmits water to the water transfer facility or directly to the consumer.

Water intake facilities are divided into types that flow and mechanically (pumps) pump water. After that, hydrotechnical structures designed to receive water from water sources or basins (reservoirs) to the main and derivation channels, and in some cases to the pipes and tunnels, will be considered. We call them channels. Such water intake facilities include irrigation of water, provision of water to pastures, derivation hydroelectrosatnation it is used for drinking water and other consumers, for example, heat and nuclear hydroelectric power plants, and in some cases, for household and drinking water supply.

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Classification of water intake hydroelectric plants. Low-pressure water intake hydroelectric plants can be classified according to several main characteristics: river, river, sea, seepage water according to the type of water intake source; mechanical uplift of water and water (through pumps) according to the conditions of water transportation from the water intake facility; in relation to the river bed, in the basin and on the shore; according to the type of means used in the fight against sediments, –with a washing machine, with washing galleries, with a gravel holder, with a gravel holder two-story, with slits, rods, etc. on the intermediate and side walls.

Tasks of obtaining water. The following requirements are imposed on obtaining any type of water: 1) to ensure guaranteed continuous water intake from the source (river) based on the water consumption schedule; 2) to protect bottlenecks, ice and fins from entering the canal; 3) not to allow high pressure to be applied when diverting water from the water intake facility; 4) to ensure the operation and suspension of the water intake facility and its individual parts during cleaning, washing, repair and in emergency situations; 5) provide protection of fish using fish protection and fish control devices.

In some cases, special requirements are imposed on water receiving structures, for example, water is extracted from the layer of the water source with a minimum temperature and high density. In addition, the structures and their parts included in the water intake hydroelectric system must meet the requirements of durability, priority, long-term operation and ease of use for hydrotechnical structures.

Peculiarities of irrigation water intake. When receiving water from the river for irrigation purposes, in most cases suspended and bottom sediments are transferred to the canal. The task of water intake nodes is to ensure that the bottom sediments do not fall into the channel and to throw them into the lower bay of the hydroelectric system. The suspended particles that have entered the channel are deposited in the clarifiers installed in its head.

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It is to ensure that the pressure loss between the water levels is minimal when the water is pumped into the field, and in turn, the pressure loss is reduced to a minimum when removing water from the water intake facility.

Rivers used for irrigation purposes, for example, are affected by the melting of glaciers in Central Asia. In this case, the water consumption graph corresponds to the hydrograph of the river when it is placed, and there is no need to build a reservoir for seasonal flow control. Therefore, the task of irrigation hydroelectric power stations is to provide the moistened level necessary for pumping water into the canal.

Water intake in one and two directions. Water consumers can be located on one or both banks of the river. Therefore, water intake from dams is intended for one-way and two-way water intake. Water transfer in two directions can be carried out using independent water intake structures located on two sides, each of which transfers water to only one bank. Water transfer in two directions can also be carried out by taking water in one direction. In this case, part of the water consumption can be carried out using a dyke built in the water discharge dam.

Water intake coefficient. The water intake of a water intake facility is characterized by the water intake coefficient. It is expressed as the ratio of the water flow taken into the canal to the water flow in the river. The water intake coefficient has a significant impact on the transfer of sediments into the canal. The numerical values of the water intake coefficient vary widely; in some cases, it reaches unity - all the water flow from the water source is taken by the water intake facility. For the rivers of Central Asia and the Caucasus, the ratio of the maximum water flow to the minimum is 100 and more.

The structure of water intake hydraulic nodes. Their types (damless and dammed) depend on the method of water supply of the system, the hydrogeological and sediment regimes of the river, and many other local conditions.

In general, the main structures of irrigation hydraulic nodes include a water intake main structure, water-conducting dams, impermeable dams built from local

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materials, dams that regulate the sediment from the upper and lower reaches, ice breakers, dams, and bridges.

If the river is used in a complex way, the structure of the hydraulic node also includes a hydroelectric power plant building, ship-passing locks, fish-passing and timber-discharging structures.

Placement of water intake hydraulic units. When placing hydraulic units, the mutual location of their primary and secondary structures should ensure the conditions for the joint operation of these structures, which meet national economic and technical requirements.

The choice of rational location of hydropower plants is ultimately carried out on the basis of a technical and economic comparison of various options. In this case, the option that meets the most environmental protection requirements and, under other conditions, provides the highest technical and economic indicators, reliability of operation of the main structures, convenient conditions for installation and repair, economy of material resources, and future development of irrigation is selected

The placement of hydraulic structures of classes I and II should be justified by experimental studies. For classes III and IV, such studies are carried out only for schemes that have not been tested in production. When developing the placement of hydraulic structures, the feasibility and technical feasibility of simultaneously performing the operational functions of the structures; the construction of structures and their subsequent commissioning; water supply to irrigation systems; energy generation; and the passage of ships and fish during the construction period should be taken into account

The topography and geological conditions of the site where the hydroelectric power plant will be located should ensure the minimum length of pressure structures; prevent flooding of the area, create the possibility of placing residential areas and main auxiliary enterprises, and establish road networks; and

preserve natural conditions for the landscape and flora in the area where the hydroelectric power plant is built

During the construction of hydraulic units, it is necessary to take into account: the concentration of concrete production, minimal intersection of concrete structures with earthen structures, compact placement of structures made of the same materials during construction; creation of conditions for work on soil reinforcement; uninterrupted discharge of construction water consumption; construction of the hydraulic unit in the shortest possible time; maximum balance of excavation and lifting and reduction of the volume of quarries, reserves, dumps, etc.

To ensure uninterrupted operation, when placing hydraulic units, it is necessary to ensure that all structures operate in the most convenient mode; to create the possibility of putting them into operation in turn; to create a favorable hydraulic regime in both bays, especially during floods and ice drift; and to minimize the transfer of bottom sediments to the reclamation systems.

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