Structure of a construction and modern condition of Bozsuv hydroelectric power station

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Состав сооружения и современное состояние Бозсуйской гидроэлектростанции

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Abstract: *in given article are given technical parameters and structure of a construction of Bozsuv hydroelectric power station. Also in article is considered the condition of hydroelectric power station after the spent planned repair.*

Аннотация: *в данной статье даются технические параметры и состав сооружения Бозсуйской гидроэлектростанции. Также в статье рассмотрено состояние гидроэлектростанции после проведенного планового ремонта.*

Keywords: *hydroelectric power station, the cascade, dam, single spillway, water intake, the derivational channel, pressure head pool, pressure head pipelines, the turbine, the generator.*

Ключевые слова: *гидроэлектростанция, каскад, плотина, холостой водосброс, водоприемник, деривационный канал, напорный бассейн, напорные трубопроводы, турбина, генератор.*

The Bozsuv hydroelectric power station is located on the channel of the Boz-so and is the first step of the cascade of the Tashkent hydroelectric power stations. The Bozsuv hydroelectric power station is placed in operation in May, 1926 under plan GOELRO.

Power station basic elements is:

1. A dam
2. A single spillway
3. A water intake
4. The derivational channel
5. Pressure head pool
6. Pressure head pipelines
7. The hydroelectric power station building

The dam blocks an old channel of the Boz-so and represents a crosspiece from loesslike loam. The slope from the pressure head party is executed with a bias 1:2 and strengthened stone. The slope bottom pool flat with a bias 1:5,5 has been strengthened by a pebble layer. Interface of a dam to coast and the basis is executed with the help cutting-in by depth 2-3 m.

The drainage device - in a sole of a local slope the drainage prism is executed from a material boulder-pebble. In the prism basis the drainage pipe is laid [1].

The single spillway is located in a right-bank part of a pressure head construction and represents the step difference consisting of an entrance part and six stilling basin. In an entrance part of a spillway six water waste apertures by section 1,5 x 2,0 m and two siphons are located. The entrance part and wells are divided by deformation seams.

The water intake - superficial, ferro-concrete, is divided by bull-calves into five flights in width 3,4 m. The ground plate in top pool has a tooth depth 5,53 m. From a local side the water intake is adjoined by the derivational channel.

The derivational channel of rectangular section has extent 30,625 m, is executed from ferro-concrete. In the right wall of the channel it is arranged valved a spillway by flight 20,03 m at which work water from the derivational channel is poured in a single spillway.

With a view of struggle with slush which has caused a full stop of hydrostation in 1935 г., the ferro-concrete tray of the semi cylindrical form with a horizontal axis has been built. The tray is located for three right bull-calves of a water intake. Slush from a cylindrical tray through a lateral aperture it was dumped in a single spillway [2].

The pressure head pool having the size across a stream of 23,0 m, is divided into 4 chambers in width 5,0 м everyone. Before an input in chambers repair obstacles and the basic shutters blocking an input in pressure head pipelines are located trash screen. In interface of a ground plate to the basis 3 vertical teeth are arranged.

Pressure head pipelines opened, steel, diameter 2,4 m, lean against 4 intermediate support everyone. Bottom anchor the support is located on distance 8,0 m from a station building. After it pipelines pass in horizontal

position and by means of a transitive cone approach to turbines. Length of pipelines - 20,0 м, a bias - 1:4. Pipelines are executed without jacks of linear expansion.

The station building consists of two separate buildings - the underwater block with located over it machine hall and a boiler-house. The underwater part of a building of hydroelectric power station is executed from monolithic ferro-concrete. A skeleton machine hall ferro-concrete with brick filling.

In a building machine hall 4 horizontal generators of the Kharkov electrotechnical factory, with power 1250 kVA, 6600 V, type 375/1250 are located [3].

Machine hall it is equipped by the bridge electric crane load-carrying capacity 10,0 t with electric wire load-carrying capacity 3,0 t. Originally turbines settled down on open air. In 1936 over them the canopy further reconstructed in the closed premise, called by a boiler-house has been constructed.

In a boiler-house building 4 Francis's turbines doubled, horizontal, with two sucking away pipes, rated power 1,1MVt everyone, with settlement pressure H=13,5 m and the expense 12 m^3/seconds are located.

Two turbines of units of №1 and №2 firms Fr. Neymayer (Munich). Turbines of units №3 and №4 Leningrad metal factories. In connection with constant increase of a water level in bottom pool the bridge for service of repair shutters of sucking away pipes repeatedly was reconstructed - the floor and a protection rose on higher marks [4].

The taking away channel of a building of hydroelectric power station is combined with the taking away channel of a single spillway and limited by retaining walls. The left-bank wall is reconstructed with a view of not allow spillover waters from bottom pool on a station platform .

According to planned repair some parts of Bozsuv hydroelectric power station have been subject to repair. Such parts concern:

The hydrogenerator № 3 was in major repairs since 2013 for 30.08.2016.

Also in the course of check and repair, following breakages have been eliminated:

1. Inspection and clearing a turbine cover.
2. Work of blades of the turbine, by overlaying welding with the subsequent polishing and balancing has been adjusted.
3. The driving wheel chamber has been ground.
4. Earrings of the directing device are replaced.
5. Bearings № 3 № 4 and etc. are replaced.

From the aforesaid it is possible to understand, that the Bozsuv hydroelectric power station plays the important role in the Cascade of the Tashkent hydroelectric power stations. After the spent major repairs and replacement of some details, the hydroelectric power station works stably and smoothly.

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