SELF-ACTION VALVES IN THE SPILLWAY

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It is known, that now for accumulation of additional volume of water in reservoirs it is possible to use various kinds of constructions, which is called hydroplus. Their firstling represented sand hillock, which is placed along the whole length of the frontal lips of the dam. In that case when the horizon of water in the reservoir does not exceed beforehand chosen border H*, when the hillock is steady, the additional volume gathers in the reservoir. When the height of water on the lip exceeds H*, hillock collapses and carried away by a stream of water and the drain starts to work.

More often are used hydroplus constructions with congregating firm partitions. In this case ferroconcrete barriers of special constructions are established in frontal partitions of the dam along the whole length of beforehand formed lip of the dam. In case of the calculated horizon of water in the reservoir the empty frame of gates starts to be filled with water, as a result the gate loses stability and is overturned and under influence of the water flow merges downstream. Sometimes various steady barriers are placed in the given gate that turn of unstable gates has led to turn of others.

The main defects of the given construction:

They functioning only in that case, when there is no destruction or overturning.

After release of emergency discharges it is necessary again to restore the gate construction, because former firm gates it is impossible to use.

Gates collected downstream should be removed to avoid backwater and plugging up the river bed.

Necessity of implementation of construction works, connected with the formation of crest of the dam's upstream face.

With the purpose to ensure the hydroplus fusegates proper operation it is necessary to accumulate the additional volume of water in the reservoir, irrespective of the flood size. The authors suggest pass the flood with the help of automatic action valves while the water level is low.

The dam works in the following way: when the height of water on the lip of a spillway starts to exceed quantity H, 1 shield around 0 junction is inclined under the small angle, opening the input of the dam and water passes downstream under the shield. During the drain moment force of pressure of water decreases, the shield goes aside position of way out. The moment of force of pressure of water again overcome the moment of force of elasticity of the spring and the shield again turns this time under bigger angle, than at the first opening, because there is increase of water level in the reservoir. Thus amplitude of oscillation of the shield will increase step by step till the elapsing way out will be equal to an output of the torrent. During all this process the dam will work by variable output.

It is clear, that mode of operation similar to work of the dam in sense of exploitation of the valve, represents some inconvenience. There is a necessity decrease oscillation frequency of the shield and so set up the damper mechanism. When the shield goes aside

of opening, the absorber does not put up resistance, oil goes from the right part of the shaft in the left by circuitous way on which the return valve is put. When the shield goes to closing, the absorber break this movement as oil at moving from the right part to the left should pass through regulating throttle having big hydraulic resistance.

In order to put up the offered valves on the frontal part of the dam it is necessary to construct piers. That the size of surface of real segment has not changed the lip of dam is necessary let down minimum ΔH_1, i.e.

$$\Delta H_1 = \left(1 - \frac{1}{n}\right)\frac{b_1}{b} H, \tag{2}$$

where b_1 – width of pier, n - number of partition.

$$n = \frac{B + b_1}{b + b_1}, \tag{3}$$

where B - all length of the dam. Size of width of the valve chooses so, that n was integer.