The Tikhovsk hydro development on the Kuban River is located at the site of debouchment of the Protoka River into the Kuban River. The hydro development is intended for irrigation purposes. The Protoka and Kuban Rivers below the site of the Tikhovsk hydro development have almost the same water-management and navigation significance, furthermore valuable fish species such as sturgeon, carp, vimba, etc., pass through the site of the hydro development for spawning. Therefore, the interests and requirements of the economy were taken into account when selecting the composition of the structures of the hydro development.

Four bays of overflow dam and navigation and fish locks are oriented into each of the rivers (Fig. 1). The structural part and mechanical equipment of structures of the same type are identical, their arrangement relative to the longitudinal axis of the hydro development is symmetric. A navigation lock is located near each of the banks. An earth platform is located between the navigation lock and the dam. Behind two bays of the overflow dam is a fish lock, and behind it are two more bays of the overflow dam. In the center of the site of the hydro development there are two bays of the overflow dam, the piers of which on the downstream side pass into a reinforced-concrete flume along which the water enters the Petrovsk-Anastasiya irrigation system.

Operation of the equipment of all structures is local, remote, and automatic. The 10 outlets of the overflow dam have the same mechanical equipment. Radial gates are the main ones. The cable mechanisms are installed on a metal trestle. The emergency gates of the upstream and downstream pools are sectional. The sections of the gates are kept in special mobile storages and move along the axis of the structure on overhead carriages, moving along monorails. The structures of the hydro development are laid out so that the overhead carriages could service the 10 bays of the overflow dam and two fish locks. Since the bays of the overflow dam and of the fish locks are the same, the sets of sections of the emergency gates are used for all aforementioned structures.

The sections of the emergency gates are maneuvered by means of a yoke with a double claw clamp [1].

The navigation locks on the Kuban and Protoka Rivers have the same structural part and the same mechanical equipment. The width of the chamber is 15 m, length 100 m, and fall 2 m. The main gates are miter gates with gate valves, identical on the upper and lower heads. The gates are moved by a rack and pinion mechanism and the gate valves are turned by a screw mechanism. The emergency gates of the upstream and downstream pools are sectional. Maneuvering is by means of an overhead carriage moving along a monorail. Storage is on a self-propelled storage carriage. The fish locks are oriented along the channel line of the Kuban and Protoka Rivers. The structural part and mechanical equipment of the locks are the same (Fig. 2). The equipment of the fish locks was designed with the consideratin of the experience of operating an analogous structure on the Fedorovsk hydro development on the Kuban River and makes it possible to forcefully transport the fish from the lower to the upper pool with minimum injury to the fishes [2].

The width of the lock chamber is 10 m, length 150 m, fall 0.2 m. Along the length of the lock there are four rows of grooves.

In the first row of grooves, starting from the upstream side, is installed a trash rack which is included in the fish locking cycle. The rack is raised by a cable mechanism installed on a metal trestle.

In the second and third rows of grooves are installed respectively the upstream and downstream slotted gates 5, 15.
The upstream and downstream slotted gates form a working chamber in which the pools are equalized and the fish are examined and counted. Directly behind the upstream slotted gate is a horizontal ichthyological platform 9. The cable mechanism hoisting the ichthyological platform is located on a reinforced-concrete trestle. The ichthyological platform represents a metal frame with a horizontal perforated skin plate.

During movement of the platform upward, it is possible to count and photograph the fish in the closed space formed by the reinforced-concrete piers, downstream face of the upstream slotted gate, and wicket of the stimulating device. In a nonoperating state the ichthyological platform is in a bottom niche. In a working state it rises to within 20 cm of the water level.

The sectional emergency gate of the downstream pool is installed in the fourth row of grooves. The sections are maneuvered by cable mechanisms installed on the lock piers. Thanks to a system of blocks, the cable mechanisms can maneuver both the sections of the emergency gates and downstream emergency gates of the culverts.

Rails for moving the stimulating device run along the entire chamber of the fish locks. The stimulating device represents a metal frame on four wheels with a rotating rack, which in a lowered state occupies the entire transverse area of the lock and during movement of the stimulating device transports the fish from the lower to the upper pool. When the rotating rack is raised into a horizontal position the stimulating device serves for hauling objects of mechanical equipment along the entire lock: sections of the trash installed in the first series of grooves are hauled away and sections of the upstream emergency gate are hauled to its place and installed, sections of the downstream emergency gate are hauled to the fourth row of grooves and installed.

The stimulating device is moved by a chain mechanism. The continuous chain, passed over a sprocket installed on the downstream side, runs along the entire lock on each side. An analogous drive of the stimulating device [3] is operating successfully on the fish elevator at the Krasnodar reservoir and fish lock of the Fedorovsk hydro development.

The sectional emergency gates of the upstream and downstream pools installed on the fifth lock are the same as those used on the overflow dam.

The emergency gates are delivered in sections from their storage place by means of a yoke by the overhead carriages along monorails running through the entire hydro development from one navigation lock to the other and are installed on the stimulating device. In the abutments of the fish lock are located culverts intended for additional feeding of the main water discharges passing through the slotted gates for the purpose of attracting fish.

Each culvert has one inlet and three outlet openings: two into the lock chamber and one at the end of the abutment.

Wheel gates with cable mechanisms are installed in the inlet and end outlet openings. The openings into the chamber are covered by stationary racks with a horizontal arrangement of the bars preventing entry of fishes into the openings of the culverts and their injury. Behind the stationary racks are installed regulating gates having a screw maneuvering mechanism.

Depending on the need, the gates on the inlet and outlet openings can be opened in any combination and to any height. The slotted gates are the most complex objects of the mechanical equipment of the fish lock [4-6].