ORGANIZATIONAL AND TECHNOLOGICAL AUTOMATED CONTROL SYSTEM OF WATER SUPPLY IN A LARGE CITY

***Dyadun S.V., Butko Y.N.**, O. M. Beketov National University of Urban Economy in Kharkov*

The city water supply system has large domestic reserves, the use of which may allow significant savings of unproductive material and energy costs, and improve the provision of the population and industry with water, and as a result, provide significant economic benefits.

The structure of water utilities management of a large city are considered. Provision of water supply provides with the help of water utilities industrial enterprise of the city, which is a single production complex. Water supply system of the city regarded as an object of management, operating in some environments. The environment are usually unmanaged subsystem, as well as those subsystems that are managed at the other hierarchical levels, in accordance with other criteria and is practically independent of the controlled variables allocated object. Select an object from the environment and the allocation of controlled variables are given in terms of management objectives.

The main objective of the control system of the city water supply under normal circumstances is to ensure that water is continuously changing needs of its customers, including the construction of a perspective, is to provide the most complete correspondence between the states of the control object and the environment over time. This correspondence shall be implemented under optimum values of certain criteria for the management and implementation of technological limitations.

In solving the problems of operational management of load flow in the water supply system at the level of production units to the environment should include the field of water and the construction of its processing (cleaning). Furthermore, environmental concern consumers, because the mechanism of formation of the required parameters in the query does not depend on the water controlled variables water system. A real system of water supply, the environment in which they operate, operational management criteria inherent in the different types of uncertainties, so the optimal management of the water supply system should be achieved by adapting it to the ever changing environment.

Lets consider the management structure of the city water utilities. Given the specificity of the urban water utilities as a control object, it should be presented in the form of six types of subsystems: subsystem supply surface water; supply artesian water subsystem; subsystem of the construction work; repair services (technical maintenance); organizational and economic subsystem; administrative subsystem. State of the environment is characterized by the supply of water, possible level of consumption of its customers and management of the parent organizations. Based on the functional purpose of the subsystems that make up the water utilities of the city, they can be divided into three types: basic (subsystem supply surface water, artesian water supply subsystem); auxiliary (subsystem construction, repair service subsystem); control (organizational, economic and administrative subsystems).

Assigning major subsystems is in ensuring consistency between the supply of surface and artesian waters and their respective customers. Appointment of auxiliary subsystems is to ensure the safe operation of water utilities and water systems, and their activities are closed to ensure the functioning of the major subsystems. The main and auxiliary subsystems have their own control systems is in ensuring that they function in accordance with the intended purpose. Technology major and minor subsystems is carried out on the basis of information, which characterizes the state of these subsystems. Control of the main and auxiliary subsystems, as well as technical and economic subsystem select the first level of control. Organizational-economic subsystem performs feasibility major and minor subsystems, and also provides a link with the environment (billing, etc.). Management coordination industrial management of water facilities in accordance with the objectives assigned to it and based on the state of the first level control systems provides a control subsystem (administrative), which corresponds to the second level of management. It also provides linkages to manage water utilities production plant to the environment and provides the necessary information on the state of the city water utilities parent organizations: the Department of housing and communal services, City Council (the third level of management).

In the construction of automated process control systems for urban water supply main difficulties and problems related to basic subsystems manufacturing plant water utilities. Unfortunately, operating in a number of cities in the automated process control system for water supply are purely informational. You must be connected to the system of collecting information for a larger number of measured pressure points of the network, and operating an automated process control system is put on optimal control. To improve the quality and efficiency of water supply systems must be widespread adoption of the operational management of water supply systems of cities, development of automated workplaces designer and manager of water supply systems based on the new technologies of effective information resource management regimes of their work. The same applies to computer-aided design water supply of cities, it is necessary to go beyond addressing specific local tasks on a computer, and to develop and put into practice complexes of programs that implement the methods of optimal design and reconstruction of water supply systems.

The block diagram of the city water utilities, which describes the relationship between the sub-systems and their functionality. Particular attention is focused on the main challenges and problems encountered in the construction of automated process control systems for urban water supply.

The implementation of organizational and technological automated control system of water supply of large cities, in practice, can significantly improve the quality and efficiency of the water supply, make better use of their internal resources by reducing wastage of water, reducing energy costs, reducing the number of accidents on the network.