

APPLICATION OF NEW TECHNOLOGIES TO WATER TRANSFER  
INSTALLATIONS

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**Annotation:** The process of transporting water through pipelines (water supply and mechanisms) is an important part of infrastructure systems. These systems are new, taking into account changing climate conditions, international requirements and technological advances. It supports the use of new technologies to increase the capacity, use and management of water resources.

**Keywords:** nanotechnology, water pressure, flow rate, automation, water resource conservation, efficient filtration.

Access. Pipeline water supply structures (water supply and drainage systems) play an important role in infrastructure systems. These systems are constantly being updated in line with changing climatic conditions, international requirements, and technological progress. The use of new technologies allows to increase the efficiency of pipeline structures, save water resources, and expand their management capabilities. **1. Sensors and IoT (Internet of Things)** Nowadays, IoT technologies and various sensors are widely used in the automation of water supply facilities. Sensors are installed to continuously monitor water pressure, flow rate, temperature and other parameters. This data is transmitted via the network to a centralized control system, providing real-time information about the condition of the facility. This helps to increase the efficiency of the system and prevent emergencies [2]. **2. Materials and processing technologies** New, durable, and long-lasting materials are being developed for pipes and other structural elements. For example, corrosion-resistant, high-quality plastics or composites, as well as special coatings, can help pipes last for years. Such materials help maintain water quality and reduce maintenance costs. [2,3].

**3. Nanotechnology** Nanotechnology is playing an important role in improving the efficiency of water supply systems. For example, nanotubes and nanomaterials can be used to improve water purification processes or reduce corrosion on the surface of pipes. In addition, new nanomaterials are being developed to detect and clean contaminants present in water. [1]. **4. Automated control systems** Automatic control systems can further optimize the performance of water transfer facilities. For example, they can automatically control water flow and pressure, enable regular system diagnostics, and improve maintenance planning. These systems are often optimized using machine learning algorithms. Automation of water management is understood as the performance of work in the system, in whole or in part, without human intervention, using automatic devices and telemechanical equipment. In automated systems, the main task of the personnel serving it is to monitor the process controlled by the automatic device and maintain the automatic device and telemechanical equipment in working condition. Automatic control can be complete or incomplete, with fully automatic control mainly controlling electric motors, pumping units, and control devices using electrode sensors. [5,6]. The architecture of automated control systems for water management enterprises often has three levels and includes: Central dispatch points; a middle level that can be connected to a number of large facilities; and a lower level, providing monitoring and control at local facilities. The main role of the introduction of automation systems is to increase efficiency, mobility, and facilitate the work of workers. Due to these changes, the level of competitiveness in the market is increasing and there is a strong use of the resource base. The definition of "automation object" includes various technical objects

(various machines and other technical devices), as well as production processes that can be performed by one or a whole complex of technological units, devices or machines. At this stage of human development, automation is being actively introduced into all spheres of human life, including everyday life. Continuous improvement and implementation of automation systems are completely interrelated processes. On the one hand, for the modernization of various industries, it is necessary to develop and implement mechanization and automation systems in already operating mechanisms, on the other hand, when creating a completely new technology, it is necessary to provide ways of its effective automation. According to their hierarchy, technical means of automation are classified into two classes: Automated systems control (ATR) Automated systems control (ATB);[5]. **5.Biosensors and ecotechnologies** Biosensors can quickly detect chemical and biological contaminants in water. This new technology is especially important in providing drinking water. Ecotechnologies can also be used to implement water recycling and purification processes in an environmentally friendly and efficient way. [6]. **6. High-efficiency filtration technologies** High-efficiency filtration technologies, such as reverse osmosis (RO) systems or nano-filtration technologies, are being used in water purification. These technologies can purify water to a high degree and improve its quality. This is not only used for drinking water supply, but also effectively used in industry and agriculture [7]. **7. "Smart" technologies in pipelines** "Smart" pipes are being developed, which incorporate special sensors and systems to warn of damage or cracks. These technologies will allow pipes to be monitored and repaired or replaced in a timely manner, thereby using resources more efficiently [6].

**Conclusion.** The use of new technologies in pipeline water supply structures not only increases the efficiency of the system, but also plays an important role in ensuring environmental sustainability, saving water resources and reducing energy consumption. With the help of these technologies, the safety and reliability of structures increase, while their maintenance and operation become more efficient.

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