and safe drinking water. In residential applications, RO systems are often installed under the sink or connected to the household water supply to provide purified water for drinking and cooking. These systems typically consist of multiple filtration stages, including pre-filters to remove sediment and activated carbon filters to remove chlorine and other organic compounds, followed by the RO membrane for final purification. In commercial and industrial settings, RO systems are used for various purposes, including desalination of seawater, production of ultrapure water for pharmaceutical and electronics manufacturing, and treatment of wastewater for reuse or disposal. Despite its effectiveness, the use of reverse osmosis systems has some environmental implications. RO systems require energy to operate, and the production of purified water generates a significant amount of wastewater, known as brine, which contains concentrated levels of contaminants removed from the water. Proper disposal of brine is essential to minimize its environmental impact. [2, 3]

In conclusion, the advantages of using purified water in civil construction are manifold and significant. Firstly, purified water helps preserve freshwater resources, especially in regions with limited or absent municipal water supplies. Secondly, it contributes to environmental conservation by reducing wastewater discharge and pollution. Furthermore, it promotes sustainable construction practices by minimizing the environmental footprint associated with water consumption. Overall, incorporating purified water into civil construction projects offers numerous benefits for both the environment and the economy, making it a valuable investment for the future of sustainable development. In terms of purification, reverse osmosis systems offer an efficient and reliable solution for water purification, providing clean and safe drinking water for residential, commercial, and industrial applications. However, it is essential to consider the environmental consequences and implement proper management practices to ensure sustainable use of this technology.

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ASSESSMENT OF THE EFFECTIVENESS OF TRENCH FASTENING USE WHEN PERFORMING CONSTRUCTION AND RECONSTRUCTION WORKS

The growth of civil and industrial construction in Ukraine depends not least on the works completed in advance to provide water supply and drainage to construction sites. For the construction and reconstruction of water management networks and hydrotechnical structures it is necessary to use safe and cost-effective methods, taking into account all possible requirements for environmental protection.

One of these methods is the use of trench fastening. Trench fastening is a process of ensuring the stability of deep trenches, which is used in the world's practice of construction, urban planning, road construction and other industries. Trench fastening can be effective when laying pipelines and building hydraulic structures in dense urban areas [1].

The advantages of trench fastening include the reduced environmental impact during construction, high efficiency, safety and cost-effectiveness. Another important advantage is that the use of this technology requires less space. Of course, this method also has disadvantages, which should be taken into account when designing and using this technology in specific conditions.

Let's consider the main stages of using trench fastening:

1. Preparatory stage: determining the expediency of using trench fastening based on such parameters as the size of the trench, the depth and nature of the soil, the presence of groundwater, and the saturation of the construction site with communications. Under favorable conditions, trench anchoring is more efficient than other methods because it allows you to reduce the time to perform the work, to minimize the volume of soil moved and to reduce the number of problems with blocking streets and roads;

2. Arrangement of the construction site works: organization of their safe execution, carrying out work on the installation of fastenings in the trench;

3. Operational stage: ensuring safety during work in the trench space using fastenings in accordance with the requirements of occupational health and safety rules, project documentation, and regulatory documents on environmental protection;

4. Dismantling of fastenings after completion of work in the trench.

These stages may vary depending on the conditions and the nature of the work, but in general, they are standard for the use of trench fastening in an urban environment.

The disadvantages of using this method are the need for additional research and detailed planning, which may take additional time and resources. The presence of restrictions can also be considered as disadvantage: in connection with dense construction trench fastening may have restrictions on the availability of space and depth, which can limit the possibilities for performing works on laying pipelines and installing hydraulic structures.

Thus, it is proposed to study the world experience of using and implementing the technology of trench fastening during the design and execution of works on the construction and reconstruction of hydraulic structures in the conditions of dense urban development. This allows us to significantly reduce the time and cost of these works. Using the example of the reconstruction of the storm sewer section during the reconstruction of Sobornosti Avenue in Kyiv, the effectiveness and universality of this method had been proven in practice, because it was not only the process of laying a new pipeline with an internal diameter of 1200 mm, but it was also the process of dismantling the old one with an internal diameter of 900 mm. Also, the use of trench fastening by LTW-VERBAU allowed it to complete the technical task in record time (700 meters of rain collector were installed in 50 days). The work was carried out in rather difficult conditions and there were intersections with various communications, cable routes and pipelines. But thanks to the versatility of the equipment and its ease of use, the reconstruction period was reduced by approximately 1.5 times.

Taking into account all of the above, the following conclusions can be drawn:

Trench fastening is an effective way to ensure the stability of deep trenches in the construction and reconstruction of hydraulic structures;

The use of trench fastening allows to reduce the risk of emergency situations and increases the safety of workers on the construction site;

Trench fastening helps to reduce the time of work and the costs of their implementation, which makes it economically beneficial;

The use of trench fastening allows to maintain the stability of soil and to prevent damage to neighboring structures during construction work;

Trench fastening can be used in any conditions, including work in water and in the polluted areas.

In connection with the increase in the volume of construction works and reconstruction of hydraulic structures, the use of trench fastening is becoming increasingly relevant and necessary to ensure the safety and the efficiency of work.

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HOUSING STOCK

Residential buildings, as well as residential premises in other buildings located on the territory of Ukraine, form the housing fund of our state according to Article 4 of the Housing Code [2].

Housing stock is a set of all residential premises, regardless of the form of ownership, including residential buildings, specialized buildings (dormitories, shelter hotels, houses of maneuvering fund, residential premises from the housing fund for temporary settlement of citizens, special homes for lonely elderly people, boarding houses for disabled people, veterans, and others), apartments, service living quarters, and other residential premises in other buildings suitable for living [3].

The housing stock is a complicated engineering complex, which consists of residential buildings, water supply and sewerage systems, heat and power equipment. It includes automatic means of control and operation, various communication networks, fire-fighting, elevator, sanitary and other equipment.

Categories of housing stock by purpose are as follows:

1.General purpose housing stock is a set of housing of all forms of ownership, intended for the residence of citizens;

2.The social housing stock is housing intended for the residence of citizens in need of social protection. This category of citizens includes disabled people, veterans, single elderly citizens. They are provided with housing in nursing homes;

3.Special purpose housing stock includes serving housing which is provided for employees of enterprises, institutions and organizations and for citizens who, by the nature of their labor relations, must live at or near their place of work. Workers, employees, students, pupils, as well as other citizens are provided with dormitories for an appropriate period. Places in boarding schools are given to disabled people, veterans, lonely elderly citizens. The special purpose fund includes flexible housing stock for temporary residence of displaced citizens and shelter hotels for refugees, homeless and internally displaced persons. The special purpose housing stock is formed by constructing apartments of new buildings, reconstructing existing houses and apartments of other categories of housing stock, reconstructing non-residential buildings and by including them in the housing stock, as well as by transferring one housing stock to the fund of another purpose.

The housing stock of Ukraine includes the following types of buildings:

1)residential buildings are the buildings that are intended for human habitation, have one or more apartments, as well as all necessary auxiliary premises.

Residential buildings are characterized as buildings with such features as:

• compliance of buildings with architectural, construction, sanitary, hygienic, fire and other norms and standards, which makes these buildings suitable for permanent residence of citizens;

• acceptance of buildings by designers and specialists of the completed building that meets the specified conditions;

• registration of building as residential by local governments.