

Deprivation of access to water as an instrument of military aggression

Consequences of Russian military shelling of water supply facilities on the territory of Ukraine in the period from February 24 to August 20, 2022



One of the drinking water points in Chernihiv, organized by volunteers (Photo: Telegram/Chernihivvodokanal UC)

Design and layout by *Mykhailo Fedyshak*
Translation into English by *Alena Miskun*



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INTRODUCTION

Since February 24, 2022, the Russian army's missile, air and artillery attacks have caused critical damage to the civilian infrastructure of Ukraine. In particular, the water supply system, namely water mains, sewage treatment plants, sewage and electrical networks, is undergoing significant destruction, limiting people's access to vital services.

According to UNICEF, only in the first 7 weeks of intensive military operations in Ukraine, 1.4 million people were left without access to safe water in the east of Ukraine and another 4.6 million people have only limited access¹. In general, 13.6 million residents of Ukraine suffer from a lack of water for sanitary and hygienic needs².

In 2014–2015, the facilities of the water supply system in Luhansk and Donetsk oblasts were repeatedly attacked by illegal armed formations supported by the Russian Federation, which was documented by the Luhansk Regional Human Rights Centre "Alternative" and presented in the report "Survival test: Everyday life of housing and utilities infrastructure for civilian population in the conflict zone"³. Subsequently, a submission to the International Criminal Court was prepared based on the collected materials.

According to the Regulation respecting the Laws and Customs of War on Land, which is an appendix to the IV Hague Convention on the Laws and Customs of War on Land of 1907⁴, and Additional Protocol I to the Geneva Conventions of

1 <https://uni.cf/3RqG2fC>

2 <https://uni.cf/3dZFvnk>

3 <https://uni.cf/3dZFvnk>

4 <https://bit.ly/3qWY6TV>

August 12, 1949 (Protocol I)⁵, it is forbidden to use weapons, projectiles, substances and methods of warfare capable of causing excessive damage or excessive suffering. International law sets restrictions on the use of permitted types of weapons and methods of military operations — it is prohibited to attack or bomb unprotected cities, towns, residential buildings or structures, provided that these buildings and cities are not used for military purposes.

According to Article 54 of Protocol I (Protection of objects indispensable to the survival of the civilian population) it is prohibited to attack, destroy, remove or render useless objects indispensable to the survival of the civilian population.

According to Article 56 of Protocol I (Protection of works and installations containing dangerous forces) works or installations containing dangerous forces shall not be made the object of attack, even where these objects are military objectives, if such attack may cause the release of dangerous forces and consequent severe losses among the civilian population.

In addition to the direct destruction of water supply system facilities, hostilities entail a deterioration of the quality of water of Ukrainian rivers which pass through areas of the front line. As an example, we can cite the situation around the Siverskyi Donets river, which is the largest river in the east of Ukraine, which flows through Kharkiv, Donetsk and Luhansk oblasts, and is the only source of centralized water supply for the region. The inefficient operation of treatment facilities due to disruption of the technological process due to military actions, projectile ruptures, flooded equipment, spills of fuel and lubricants pollute the river with harmful substances, as evidenced by the results of the samples taken⁶. In the conditions of intense fighting in Donetsk oblast, the modern Water monitoring laboratory of the eastern region was evacuated from Sloviansk, so the specialists of the Siverskyi Donets Directorate of basin management of water resources can no longer effectively monitor the state of the river.

This publication, prepared by the Luhansk Regional Human Rights Centre “Alternative”, presents an **overview of the work of the selected four communal enterprises that provide services for centralized water supply and drainage (Voda Donbasu Utility Company, Mykolaivvodokanal Utility Company, Kharkivvodokanal Utility Company, Chernihivvodokanal Utility Company)** in the conditions of the Russian-Ukrainian war in the period from February 24 until August 20, 2022.

5 <https://bit.ly/3QYX1FC>

6 <https://bit.ly/3SW8Fm5>

The nature of the Russian shelling, their consequences for the civilian population and the existing challenges for water service workers in different oblasts of Ukraine are similar with the difference mainly in the intensity of hostilities and the scale of destruction. Therefore, the publication describes only individual cases, which make it possible to form an impression about the problems of water companies in other oblasts of Ukraine, which are also subject to Russian attacks.

Information was obtained from open sources, including national media, social media, official statements and public eyewitness accounts⁷.



7 The information presented in the publication is not exhaustive

KEY OBSERVATIONS

In the conditions of the Russian-Ukrainian war, the issues of water supply and water safety have become extremely urgent. Ukraine ranks 111th among 152 countries of the world in terms of water resources availability, and 17th among 20 European countries. The least abundant water resources are in Donbas, Kryvyi Rih, the Autonomous Republic of Crimea and the southern regions of Ukraine, where at the same time the largest consumers of water — industry and agriculture — are concentrated.

The war, which Russia unleashed against Ukraine back in 2014, had the greatest impact precisely on those regions where the situation with water supply was the worst even before hostilities. In particular, this applies to Donbas and the Autonomous Republic of Crimea, which received most of its water from the mainland (about 85 %). Due to the occupation of Crimea by Russian troops, water supply through the North Crimean Canal was suspended due to the fact that, according to international humanitarian law, the obligation to provide for the needs of the civilian population in the occupied territories rests with the occupying country. During the eight years of war, Crimea was not provided with a sufficient amount of water, which led to a water crisis in the region.

In 2022, water became one of the reasons for the attack of the Russian army on the Kherson region. Back in April 2021, the head of the Defence Intelligence of the Ministry of Defence of Ukraine (hereinafter — GUR MoD), Kyrylo Budanov, suggested that one of the likely scenarios could be a military operation by the armed forces of the Russian Federation to solve the problem of water supply to Crimea with the capture of part of the territory of the southern oblasts of Ukraine⁸. On February 24, having launched a full-scale invasion of the territory of Ukraine, the occupiers seized the main structure of the North Crimean Canal, the Kakhovka HPP, and all

8 <https://bit.ly/3ybejZx>

hydrotechnical structures regulating the supply of water from the Kakhovka reservoir to the Crimea peninsula. And on February 27, a temporary dam, a road bridge and the main dividing wall of the canal were destroyed. Already at the beginning of spring, the Russian Federation began to withdraw water from Kakhovka reservoir of the lower basin of the Dnipro River and fill the North Crimean Canal. According to the information of the State Inspectorate, the amount of daily losses due to the arbitrary use of water resources of Ukraine amounts to more than UAH 32 million⁹.

At the beginning of the summer of 2022, experts of the Bellingcat information agency conducted a study based on satellite images, according to which it was concluded that as a result of Russian shelling, the water supply system, which provided drinking water to 4 million people in most of Donetsk and Luhansk oblasts, stopped functioning. The region turned out to be cut off from all vital communications — water supply, sewage works, electricity. The system of canals and pipelines was damaged by months of shelling, power lines were cut, and power plants were bombed. Since sustainable water supply is impossible without electricity to power pumps and filters, the water situation will remain critical, as repairs will require demining and restoration of power lines.

Provision of water supply is one of the biggest and most important problems in the regions affected by hostilities. As of the end of April, as a result of the almost complete destruction of communications in the territory of Luhansk oblast, which at that time remained under the control of the Ukrainian authorities, centralized water supply was stopped in Severodonetsk, Lysychansk, Popasna, Rubizhne¹⁰. Later, all these settlements were occupied by the Russian army. The water supply was not restored, people were forced to collect water from puddles, collect rainwater, queue up to take a shower at “street washrooms”.

Water supply and drainage facilities in the Donetsk, Zaporizhzhya, Kharkiv and Mykolaiv oblasts were significantly damaged. Full-scale war, lack of access to drinking water and destroyed sanitation infrastructure, combined with rising summer temperatures, increase the risk of acute infectious diseases.

At the very beginning of the war, the waters of the Irpin River helped stop the enemy onslaught advancing on Kyiv. On February 25, the Ukrainian military blew up the bridge in Demydov and the protective dam of the Kyiv Reservoir between Kozarovychi and Liutizh¹¹. Water flooded the mouth of the Irpin river and the vicinity of Demydiv, making the Russian offensive on this part of the front ineffective.

9 <https://www.dei.gov.ua/posts/2161>

10 <https://bit.ly/3SzxN23>

11 <https://bit.ly/3C6x69B>

As a result, more than 100 detached houses were partially flooded in the village of Demydiv. Local residents were sympathetic to the situation, realizing that thanks to the decision to blow up the dam, the capital was saved from occupation. At that time, a saying was born: "Better a flood in the house than a Moskal"¹².

Currently, the necessary repair work to restore the operation of the locks has been completed. The pumping station is working at full capacity, the water level has already dropped by 70 centimeters. A decision was made by the state to provide financial support to the affected households¹³.

According to the President of the association Ukrvodokanalekolohia Dmytro Novytskyi, one of the urgent challenges of today in terms of the work of water supply enterprises is the problem of financing of water utilities¹⁴. In case of destruction of water supply and drainage systems, there is an immediate need for financing of measures to quickly restore the functionality of networks and equipment at enterprises, because the sanitary and epidemiological condition of the settlement depends on this, as well as the accessibility of water for fire extinguishing during emergency situations. At the same time, throughout the territory of Ukraine, especially in those regions where active hostilities are taking place, the consumers are losing their capacity to pay.

In those regions that were or are in the risk zone of bombing or hostilities, there is a significant outflow of local residents, which entails a significant decrease in payments from the population. The lack of adequate funding affects the timely payment of wages to employees who work in difficult conditions of martial law. There is a trend when those water utilities that need the most funds to restore their destroyed infrastructure receive the least revenue from consumers.

There is also a problem associated with a significant increase in the number of consumers in cities in western Ukraine, which leads to an increase in the load on water treatment systems and sewage systems. Water utilities need to spend money on unforeseen emergency works, purchasing additional volumes of reagents, electrical energy, etc.

Dmytro Novytskyi believes that the introduction of economically justified tariffs is the most logical solution, but of course, the same approach cannot be applied to all enterprises. An increase in the tariff will not save the situation in settlements that have suffered significant destruction. In such cases, during the restoration of full-fledged water supply, financial assistance from the funds of both the state and local budgets should be provided.

12 <https://bit.ly/3C7rCeU>

13 <https://bit.ly/3UQCLJk>

14 <https://bit.ly/3C62u8c>

During the war, the enemy destroys the water supply infrastructure in order to subjugate and demoralize the population, to exert pressure on the political leadership in order to force them to surrender. Russian troops are carrying out targeted strikes on the infrastructure for the intake, purification and supply of water, sewage treatment facilities. The problem of lack of drinking water in Ukraine is now felt by millions of people in the frontline territories. The causes of water scarcity caused by military actions are exacerbated by natural ones, including climate change. In the post-war period, a comprehensive implementation of state policy in the field of drinking water and drinking water supply is needed, taking into account the new challenges and problems brought by the war.



VODA DONBASU UTILITY COMPANY¹⁵

Voda Donbasu UC is strategically important as the only water supplier in Donetsk oblast, which provides water supply and drainage services to 289 settlements (about 3.9 million people).

The main task of the enterprise is water purification, provision of uninterrupted drinking and technical water supply to settlements and enterprises of the region, as well as treatment and disposal of wastewater. Voda Donbasu serves more than 10,000 km of main water pipelines and sewerage networks, filter stations, energy supply and communication facilities in the region, and more than 11,000 workers are involved in the production process.

The main source of water supply for the population is the Siverskyi Donetsk-Donbas canal, built in the late 1950s. Reserve reservoirs and underground sources

15 Materials used in this section:

<https://bbc.in/3rnQGcu>

<https://t.me/andriyshTime/1480>

<https://t.me/andriyshTime/1485>

<https://t.me/andriyshTime/1615>

<https://bit.ly/3fsfY6m>

<https://bit.ly/3CvK6qN>

<https://bit.ly/3T9gfKj>

<https://kramvoda.com>

<https://bit.ly/3SATJu4>

<https://bit.ly/3SQwHyH>

<https://bit.ly/3dZoOZO>

are used as well. Potable water conditioning and purification is carried out at filter stations that use a two-stage water treatment system.

Donetsk oblast is one of the regions of Ukraine where fierce fighting has been going on for the past six months. Due to continuous shelling of civilian infrastructure, water supply disruptions are inevitable. Already after a month of war, about 200,000 residents of Donetsk oblast were left without access to potable water. The suspension of water supply is connected, in particular, with numerous damages to power lines as a result of hostilities.

On April 6, due to Russian shelling, power was cut off at the pumping station of the first rise of South Donbas water pipeline, which supplies water to four filtering stations: Karlivka, Velykoanadolsk, Starokrymsk No. 1 and No. 2. Thus, the water supply was stopped in 49 settlements of Donetsk oblast, including the cities Pokrovsk, Selydove, Dobropillia, Myrnohrad, Novohrodivka, Vuhledar. The employees of the station were not injured, they managed to hide in the bomb shelter during the shelling.

The company's facilities were repeatedly attacked by the Russian army. It was recorded that five projectiles hit the territory of the Verkhnio-Kalmius filter station, which damaged the horizontal sedimentation tank, the warehouse and the railway track for the delivery of reagents. As a result of the shelling, the building of the administrative and operations facilities and the garage of the Siversk District of Chasiv Yar Regional production department were destroyed.

At the end of April, a number of the company's most important water supply facilities remained without power as a result of hostilities. These are the Donetsk



filter station, the complex of pumping stations of the third rise of the Siverskyi Donets-Donbas canal, the pumping station of the first rise of the South Donbas water pipeline, all the objects of the Volnovakha Production department of water supply and sewerage and the Mariupol Regional production department. Out of 18 filter stations, 14 were functioning.

At the beginning of summer, in connection with numerous damages to the facilities of Voda Donbasu UC due to active hostilities, the supply of drinking water to the cities and towns of the oblast, including the city of Kramatorsk, was reduced. To ensure water supply, potable and technical water was delivered to the residents of the respective settlements.



There are known cases when, due to hostilities, the supplier of disinfectants refused to deliver liquid chlorine and chlorine-containing reagents to “Company “Voda Donbasu”. In this regard, at the filter stations, employees were forced to treat water with increased doses of potassium permanganate, which was not enough for complete disinfection of drinking water. Therefore, the company appealed to its customers with a recommendation to boil tap water for at least 15 minutes before consumption.

Every day, technologists, energy engineers, and emergency repair crews of Voda Donbasu carry out all the necessary measures to provide people with drinking water and drainage services to the best of their ability — they eliminate leakages and congestion in pipelines, replace emergency sections of the water supply and sewage network.

One of the most problematic cities in Donetsk oblast in terms of sustainable water supply is Toretsk. Troubles began back in 2014 with the start of active hostilities. The city's water supply was enabled through a water pipeline from the Horlivka filter station (a territory not under the



control of the Ukrainian authorities since 2014), which was often damaged due to constant shelling. In order to carry out the repair works, a regime of silence had to be established and security guarantees received from the armed forces of the Russian Federation, which could be expected for weeks. In 2021, the construction of an alternative water pipeline from the Siverskyi Donets — Donbas pumping station and a new filtering station began, which were supposed to solve the problem of the lack of water supply for the front-line city and nearby settlements. The full-scale Russian invasion made its adjustments. In the middle of February 2022, another accident occurred at the water supply, for the elimination of which the silence regime was not provided. For the sixth month, Toretsk lives without centralized water supply. Despite the constant shelling and mandatory evacuation announced by the authorities, local residents remain in the city, for whom water is brought by employees of the State Emergency Service of Ukraine (SESU) and communal services.

During the brutal shelling of Mariupol by the Russian army in February-April, all 22 pumping stations were destroyed or flooded, more than 50 % of the water supply networks were damaged, leaving the city's residents without water. People were forced to stand in huge queues to wells, risking another attack, melting snow, draining technical water from batteries and boilers. Citizens of Mariupol who managed to leave the city said that it was the need to go for water and stand in the open air for several hours that caused a large number of casualties among the civilian population.

In May, the city was completely occupied, the shelling subsided, but the water problems did not disappear. The water pipes are broken, the sewage treatment and drainage systems do not work, and not all areas have the electricity needed to pump water through the network. The occupying administrations tried several times to turn on the water, but it always ended with flooded basements and apartments. Schedules for the delivery of drinking water are posted in the districts of the city, for which huge queues traditionally line up. The majority of Mariupol residents have no access to drinking or technical water, they are forced to collect water from natural sources and wash clothes in puddles after heavy rains. The Regional Emergency Director for the European Region, World Health Organization, Dorit Nitzan, reported that an outbreak of cholera is possible in Mariupol due to the destroyed water supply system. In the city, sewage water is mixed with drinking water, which threatens the spread of many infectious diseases.



According to the assessment of the Mariupol City Council, it will take more than a year and at least USD700 mln to fully restore the water supply. Therefore, this is possible only after the return of Mariupol under control of Ukraine.

Currently, the situation in Avdiivka, Vuhledar, Marinka, Krasnohorivka, and the surrounding villages and towns is very difficult. Settlements are under heavy shelling. There is no water, gas, or electricity in the cities. The local authorities are trying to arrange supply of water in tanks for those residents who still remain in their homes, but it is becoming more and more difficult to do so.

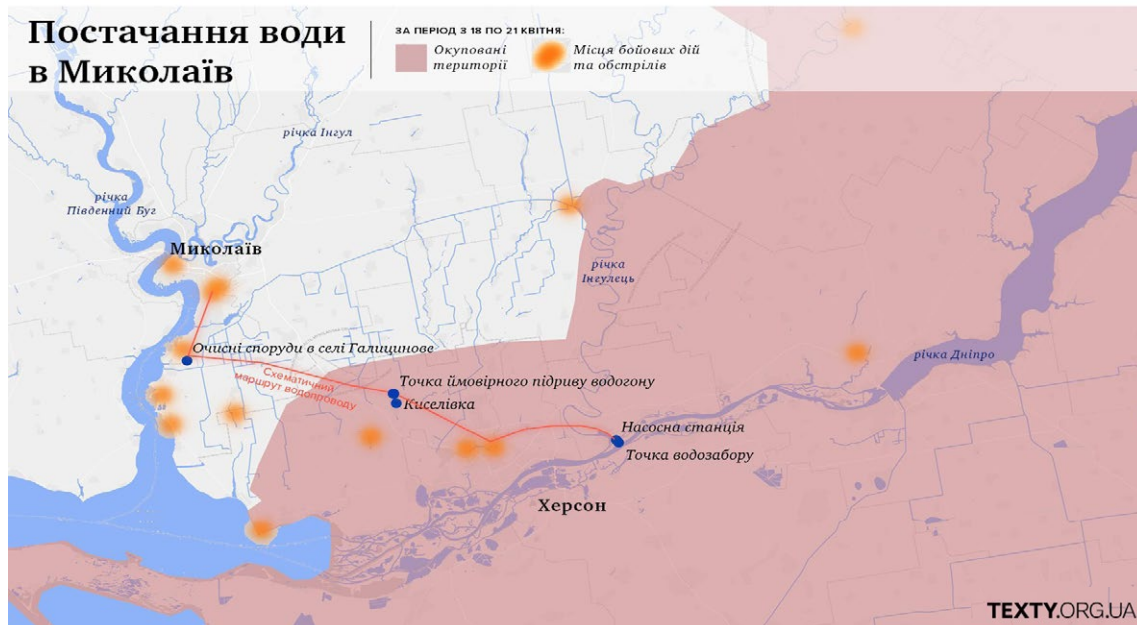


MYKOLAIVVODOKANAL UTILITY COMPANY¹⁶

Mykolaivvodokanal is a utility company that provides cold water supply and cold and hot water drainage services in Mykolaiv. The main source of the city's water supply is the Dnipro River. Physically, the water intake point is located in Kherson oblast. From there, two lines of pipes with a diameter of almost 1.5 m each stretch along a curved route for more than 70 km. Currently, 80 % of the route passes through the territory of the occupied Kherson oblast. Although Mykolaiv is surrounded on three sides by the Pivdennyi Buh and Ingul rivers, it is impossible to use their waters as a source of water supply due to their high level of pollution, which the existing city treatment facilities cannot cope with. The water in both rivers has an increased content of salts and heavy metals.

From the very beginning of the Russian aggression, Mykolaiv became a real southern outpost of Ukraine. The city suffers from enemy attacks almost every day. On July 1, the Ministry of Defence of Ukraine reported that out of 126 days of the war, Mykolaiv was not shelled for only 18 days.

16 Materials used in this section:
<https://bit.ly/3EcVQ2p>
<https://bit.ly/3e04alb>
<https://bit.ly/3LZ6Ked>
<https://svidok.info/uk/news/66575>
<https://bit.ly/3fEfgDI>
<https://bit.ly/3fH5YpS>
<https://t.me/vodokanal1/1009>
<https://bit.ly/3USSsQt>



On April 12, the Dnipro-Mykolaiv water pipeline was damaged by rocket fire from the Russian army. The accident occurred in the territory where hostilities are ongoing, so there is no access for repair crews to the place of damage.

The city with a population of almost 500,000 people was left without a centralized water supply. Residents were forced to collect rainwater or collect it for technical needs directly from the South Buh River. Mykolaivvodokanal organized the transportation of technical water to residential quarters. The residents of Mykolaiv were learning from the official information channels of the local authorities on Facebook and Telegram about when and where the water tank trucks would arrive. The City Council Department of housing and utilities has created an online map on which points of filling of technical and potable water are indicated. At the same time, they brought back to operation idle wells and drilled new ones from where drinking water could be collected. Although there were more trucks and wells every week, they were still not enough for a huge city. Many people had to walk several blocks away to get drinking water.

Hospitals and some other public facilities were connected to their own wells even earlier. Volunteers helped the elderly and people with reduced mobility – they delivered bottles of water to the doors of their apartments and houses.

The whole country helped to supply Mykolaiv with water. Kyivvodokanal provided 19 water containers with a total volume of 26 m³, which were used to deliver water to citizens. In April, residents of Odessa collected 9 tons of drinking water in bottles, which before sending were displayed in the form of a map of Ukraine. As of August 2022, a total of 890 tons of drinking water were sent from Odesa to Mykolaiv residents. Trucks with water traveled from Poltava, Kremenchuk, Hadiach, municipal workers of Kropyvnytskyi helped deliver water by tanker trucks directly to Mykolaiv.



In order to return at least technical water to the taps of Mykolaiv residents, it was decided to urgently fill the system with water from the Pivdennyi Buh, and then gradually replace it with water from wells. At the beginning of May, the Cabinet of Ministers of Ukraine allocated UAH 56 mln for restoration of water supply in Mykolaiv. The money was spent on the drilling of new wells and the organization of pumping water from the Pivdennyi Buh into the system. On May 7, Mykolaivvodokanal employees started taking water from the Dnipro-Buh estuary. In just two days, technical water appeared in the taps of some residents, and on May 16, water supply was restored according to schedule throughout the city. Water is disinfected with liquid chlorine, but its quality, even after cleaning, does not meet the requirements of State sanitary norms and rules. Therefore, it is allowed to be used only for household needs. At the same time, the Mayor Oleksandr Senkevych noted that the local authorities are preparing a project for the use of four water intakes with separate water purification systems up to the level of drinking water. The mayor of Mykolaiv said that there will be no drinking water in the system for at least two more months.

In an interview in August, the director of Mykolaivvodokanal Utility Company Borys Dudenko said that the situation with Mykolaiv water supply is very difficult. Due to the high content of salt in the water of the Pivdennyi Buh, the water pipes wear out many times faster, strong corrosion destroys the metal, and the number of leakages increases. Currently, a French company is developing a feasibility study regarding the choice of a future centralized drinking water supply model. Two options are being considered – to go higher along the riverbed of the Pivdennyi Buh, where the water is of better quality, and to build a new water intake station and pipeline to Mykolaiv, or to install an industrial facilities for reverse osmosis water purification while maintaining water intake from the Dnipro-Buh estuary. In the future, it is planned to attract investors/donors to work on the selected water supply model.

Of course, the best option would be to return the water supply from the Dnipro after the de-occupation of Kherson oblast. However, even after the liberation, the utility company will have to spend at least a month to repair the damaged pipe, and some time will also be needed for demining. Therefore, the people of Mykolaiv should not hope for the restoration of water supply from the Dnipro through Kherson oblast in the near future.

During the active hostilities in the city, the facilities of Mykolaivvodokanal Utility Company were repeatedly subjected to enemy attacks. In March, as a result of mortar shelling, the city's sewage treatment facilities located near Halytsynove village were damaged. The electrical system was damaged, the mechanical sewage treatment system was partially disabled, and the reserve sand traps involved in the technological cycle of water purification from small debris and sand were destroyed. The concrete slabs of the corridor-type aeration tanks and the aeration system, where the biological treatment of waste water takes place, were also damaged.

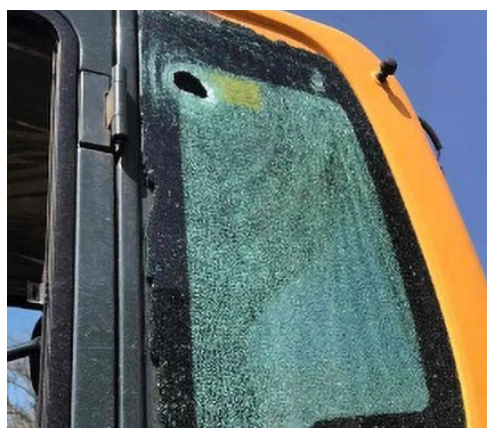


In May, once again, the city's sewage treatment facilities came under artillery fire from the Russian army — the windows of the building were shattered, the primary sedimentation tanks were damaged, and the roof of one of the workshops was destroyed. In two days, as a result of night attacks, two water purification stations at one of the facilities of the Mykolayivoblteploenergo UC were damaged. In June, the water disposal pumping station was fired upon, and not a single surviving window remained in the building from the shock wave. At that time, the total property damage of Mykolaivvodokanal was estimated at over UAH 20 million.



On several occasions, employees of the company came under enemy fire while carrying out repair work. Once, the operator of the excavator was “blown out” from the cab to the ground by a shock wave. During the Russian aggression, five communal workers were injured while performing their duties, and even more received psychological injuries.

Despite air-raid alarms, daily dangers and hostilities near Mykolaiv, the employees of the water company continue to faithfully perform their work. In addition to the ongoing maintenance of water supply and drainage networks, a lot of attention is paid to the prompt elimination of the consequences of shelling of the city that affect the water supply system.





KHARKIVVODOKANAL UTILITY COMPANY¹⁷

Kharkivvodokanal is a utility company engaged in extraction, distribution, transportation, water supply and drainage in Kharkiv and Kharkiv oblast. The enterprise has one of the most developed water supply systems in Ukraine. The total length of water pipelines and water supply networks is 2669.7 km. Three independent sources of water supply are used for water supply in Kharkiv and Kharkiv oblast — Pechenizke reservoir, Krasnopavlivske reservoir and artesian wells.

Since February 24, 2022, Kharkiv and other cities of the oblast have been under almost daily attacks. Air raids, missile attacks, and heavy artillery fire damage the pipelines of water supply and drainage networks, disrupt the operation of electrical networks, because of which in turn the voltage on pumping units that pump water drops. Often, water supply to high-rise buildings is carried out with reduced pressure. In such cases, Kharkivvodokanal requests the residents of the lower floors to provide water to their neighbors from the upper floors.

At the end of May, the water supply networks of the Shevchenko district of Kharkiv were severely damaged as a result of direct hits by Russian shells. An overhaul of the inspection well at a depth of three and a half meters was promptly carried out, and five meters of drainage networks were remade. Restoration work was carried out without disconnecting consumers from water supply.

17 Materials used in this section:
<https://bit.ly/3rrFk7a>
<https://bit.ly/3CqjXcP>
<https://bit.ly/3M0m6Pq>

Increased attention is paid to the Saltiv, Kyiv and Industrial districts, which suffer the most from enemy shelling. Large-scale restoration work on external and internal water supply and drainage communications continues every day — water supply networks and sewage communications are being replaced, inspection wells are being equipped. After explosions, night and day air raids, there are a lot of emergency calls. The priority of repairs is given depending on the complexity of the damage and the consequences they can lead to. Factors such as flooding of basements where people are hiding require speeding up repair work.



Uninterrupted operation of facilities that provide stable water supply to consumers directly depends on the good condition of electrical equipment and power transmission lines, therefore employees make every effort to ensure continuous transmission of electricity to facilities and reliable operation of electrical equipment.

During the first three months of the war, the aggressor caused enormous damage to Kharkiv waterworks. As a result of artillery shelling and airstrikes, sections of water pipes of various diameters with a total length of 500 meters were completely destroyed, and important facilities providing the city's water supply were heavily damaged. Employees of the enterprise often have to perform repair work under enemy fire, risking their lives and health. During one of the trips to repair damage to the power transmission cable line, employees of the electrical engineering laboratory of Kharkivvodokanal came under heavy fire, as a result of which some of them were injured. The head of the repair crew received a shrapnel wound in the head.

At the beginning of August, representatives of the Red Cross Society of Ukraine and the State Emergency Service conducted training on the basics of safe behavior and survival in difficult wartime for the employees of Kharkivvodokanal. Participants were taught the rules of behavior when detecting explosive objects, during shelling and missile strikes, and instructed on how to provide first aid for injuries and other accidents.



It is worth noting the high skill and incredible self-sacrifice of the company's employees, who continue to restore cold water supply networks in difficult conditions. From the first day of the military aggression, certain adjustments were made to the coordinated work of the team and the main areas of work were highlighted. These are the provision of water to the residents of Kharkiv, the prompt elimination of damage to indoor systems caused by shelling, and the maintenance of basement shelters in proper condition. Sometimes teams have to help rescuers during the urgent evacuation of residents of houses hit by shells. Employees of Kharkivvodokanal take people out of dangerous places, share with them protective overgarments and shoes.

"Our area of responsibility is located in one of the most dangerous districts of Kharkiv. That is why we are working under almost unceasing enemy shelling. At first it was a little awkward. But gradually we stopped paying attention to the enemy's actions, because it is necessary to work extremely quickly and efficiently so that the people of Kharkiv always have water. Wise people say that only fools fear nothing. I wholeheartedly agree with this, but we will continue to faithfully fulfill our important mission with our comrades,"

SAYS THE PLUMBER OF THE MOSCOW DISTRICT DEPARTMENT
FOR MAINTENANCE OF INDOOR SYSTEMS.

"Today we are all a big family. Utility workers, firefighters, security forces and residents of Kharkiv. Our workers do not wait for the equipment, but immediately go to the place of the emergency and begin to fix it, and already during the repair we determine what materials or equipment need to be brought. We constantly support each other when we work in dilapidated buildings,"

EMPHASIZES THE HEAD OF THE MAINTENANCE
DEPARTMENT FOR INDOOR SYSTEMS.

CHERNIHIVVODOKANAL UTILITY COMPANY¹⁸

Chernihivvodokanal is a utility company that provides services for the centralized supply of cold water and drainage to the population and enterprises of the city of Chernihiv.

The source of the city's water supply is the underground waters of the Buchakske and Sineman-Nyzhnokreidove aquifers, which do not require additional treatment. 65 artesian wells are suitable for water intake. All waste water is collected and pumped to sewage treatment plants, where it undergoes complete mechanical and biological treatment.

The city of Chernihiv suffered from artillery and air attacks from the first day of the war. During the first two weeks of the Russian aggression, a significant number of water networks were damaged by shelling, as a result of which entire streets were cut off from water supply. The blackout of electric networks is a big problem for uninterrupted water supply to all consumers of high-rise buildings. Chernihivvodokanal provides a pressure of 2.6 atm, which is enough to supply

18 Materials used in this section:
<https://t.me/Chernihivvodokanal>
<https://bit.ly/3Ct9ugy>
https://fb.watch/c6GBB7H_4G/
<https://bit.ly/3CtjAOJ>
<https://fb.watch/cm6yPSoek4/>
<https://fb.watch/clgl4ibMjS/>
<https://bit.ly/3Edaabf>

water approximately up to the fifth floor. Water is supplied to the upper floors with the help of water pressure boosting pumps (PBP), which are located either in the building or nearby. In the event of a power outage in the house, the PBP will also not work. Accordingly, water will be only on the lower floors.

Chernihivvodokanal has repeatedly emphasized that in the absence of cold water in the taps, it is possible to use hot water supplied by the CHP plant and Teplokomunenergo, which meets drinking water standards and is suitable for drinking and cooking.

On March 14, as a result of a powerful air strike, the water pumping station, which supplied water to a third of the city's population, was completely destroyed. At the same time, five people died – a security guard of the facility and an employee of the water company along with his family. They spent the night at the station, because they hoped that they would be safer there. During the shelling, they decided to run from the building to the underground storage and during the movement they were killed by the explosion of another bomb.



After such an accident, the pressure in the system dropped, and only 1–2 floor apartments in buildings located below the level of the pumping station were left with water supply. Drinking water distribution points began to be organized around the city. Employees of the Vodokanal exerted their utmost efforts to launch backup sources of water supply, but this depended not only on the readiness of the facilities of Chernihivvodokanal, but also on the availability of electricity. Due to damage to buildings and ruining of house networks, water supply had to be shut off in various areas of the city.

A month after the start of the war, as a result of the destruction of the facilities of the Chernihivvodokanal and the lack of electricity, the centralized water supply of the entire city was completely stopped. Due to the blackout of sewage pumping stations, the drainage system stopped working. In order to avoid clogging of sewers in the building and leaks of sewage outside, the water company has repeatedly appealed to consumers to dig public toilets and cesspools. Persons with disabilities and elderly people living on the upper floors of buildings were advised to use buckets or other containers as toilets, which relatives or volunteers would then take to the pits. The main thing was to prevent the spread of infection from sewage leaks into basements and apartments.



Chernihivvodokanal and other communal enterprises of the city continued to deliver drinking water to all areas of the city, stationary water filling stations were organized. Due to the limited number of containers for transporting water, restrictions were imposed on its distribution – no more than 10 liters per person. Since there was enough drinking water in Chernihiv, the main problem was how to lift it (generators needed) and deliver it to the population (containers and transport for their transportation needed). Through local mass media and social networks, Vodokanal appealed to all interested persons who have their own transport and

large containers for help in providing the city with drinking water. Both ordinary citizens and enterprises and organizations responded:

"We have a house in a suburban area, we have a well, and our neighbor has a generator. So we pumped water first for our own needs, later residents of neighboring houses began to come. Then we saw an announcement by the water company that they needed transport and containers for transporting water. That's how we started helping."

"There is water on our street, and we decided that in the evening and at night, when the pressure is higher, we will collect water and deliver it in the morning. While I distribute water in the residential areas, the guys collect it in containers."

"There is always a queue, about 10–15 thousand people pass by per day. We help as much as we can — we collect water for the elderly, we provide psychological support, we reassure those who are panicking, we say that there will be water, it will not go anywhere."





At the beginning of April, the Russian invaders were expelled out of Chernihiv oblast, and the city began its recovery. From the very beginning of hostilities, almost all the facilities of Chernihivvodokanal came under fire. In general, three out of five large water pumping stations in the city were completely destroyed, water tanks were pierced by aerial bombs, main networks were badly damaged, and a lot of special equipment of the water supply company was burned – about 10 units, which was half of the available amount. According to the mayor of Chernihiv, Vladyslav Atroshenko, the total amount of damage to water supply facilities is estimated at approximately 60 million euros.





As of April 12, about 30 % of households in Chernihiv had centralized water supply – mainly from the first to the fifth (maximum) floors of buildings located near network wells. The worst situation was observed on the outskirts of the city, where active fighting took place. It was not possible to start the work of the two surviving pumping stations in full due to the lack of electricity and the mining of part of the wells.

Due to the load on the networks, which arose after the water supply, new leaks were discovered every day. If in peacetime the water supply company eliminated 5–6 leaks a week, now there were hundreds of them. Among the biggest problems of establishing water supply are destroyed water pumping stations and low water pressure in the network, which did not allow turning on pressure boosting pumps.

Chernihivvodokanal announced the sequence of works:

- to increase the pace of repairs;
- to put water pumping stations into operation;
- to increase in pressure in the network;
- to put pressure boosting pumps into operation.

Little by little, minimum water pressure (up to the 1st-2nd floor) was provided in almost all areas of the city. Residents of the first floors were asked to help their neighbors from the upper floors, who had no water at all. Vodokanal also appealed

to the utility companies of Chernihiv with a request to install water faucets in the waste collecting chambers of houses so that the residents of the upper floors could collect water from there. Such taps were installed in most of the houses, and in connection with this, the delivery of water in the territory of the city of Chernihiv was stopped.

Starting from April 25, Chernihivvodokanal started gradually connecting the pressure boosting pumps of the water supply system to supply water to the upper floors of buildings. The situation with water supply in the city has improved significantly, but it still remains unstable. In addition, due to a significant increase in drinking water consumption during peak times, there is not enough water available. It is not possible to increase the volume of water supply due to damage to the pumping equipment as a result of hostilities.

It is worth emphasizing that UAH 150 million was directed to the restoration of centralized water supply and drainage in the city of Chernihiv in accordance with the government order "On the allocation of funds from the reserve fund of the state budget for financial support of Chernihivvodokanal UC".