

**Shelling of the Donetsk Clinical Territorial Medical
Association named after Kalinin using MLRS on
December 11, 18 and 19, 2022**

PUBLIC INVESTIGATION

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ABBREVIATIONS

UAF - Ukrainian Armed Forces

DPR - Donetsk People's Republic

Kalinin DCTMA - Donetsk Clinical Territorial Medical Association named after Kalinin

M. Gorky DonNMU - Maxim Gorky Donetsk National Medical University

LPR - Luhansk People's Republic

IABr - Independent Artillery Brigade

INIBr - Independent Naval Infantry Brigade

IMBr - Independent Mechanized Brigade

IMIBr - Independent Motorized Infantry Brigade

MLRS - Multiple Launch Rocket System

RF - the Russian Federation

SMO - Special Military Operation

JCCC - Joint Centre for Control and Coordination

OC - operational capabilities

PREAMBLE

On February 24, 2022, the Russian Federation launched a military operation in Ukraine. Vladimir Putin called its goal “to protect people who have been subjected to genocide by the Kyiv regime for eight years”¹. According to the Minister of Defense of the Russian Federation, as of July 03, through the efforts of the Armed Forces of the Russian Federation, the LPR and the DPR, the entire territory of the LPR was liberated, which was one of the primary tasks of the SMO². However, as of December 15, 2022, more than 40% of the territory of the DPR was still controlled by the Ukrainian security forces³.

In the area of the Donetsk front, offensive operations were constantly carried out on the positions of the Ukrainian armed formations. In response, the UAF began to use the tactics of intimidating the civilian population, striking at crowded places, civilian infrastructure facilities, transport and trade hubs, shelling Donetsk, Yasinovataya, Makeyevka and other front-line settlements of the DPR on a daily basis.

From November 27 to December 26, 2022, the UAF indiscriminate shelling of densely populated areas of Donetsk acquired a particular intensity. The capital of the Donetsk People’s Republic was hit daily, including in its central regions. At the sites of shelling, the remains of Grad MLRS missile projectiles (see Fig. 1) or its Czech counterpart RM-70 MLRS (see Fig. 2) were found.

The first of many episodes that occurred during this period were Ukrainian artillery strikes on the central streets of Donetsk on November 27, 2022⁴. On this day, residential buildings, a kindergarten and a café were damaged. Since then, Donetsk has been subjected to indiscriminate shelling daily. Often it happened 2-3 times a day.

¹ Message of the President of the Russian Federation (published on 24.02.2022) Official website of the President of the Russian Federation URL: <http://kremlin.ru/events/president/news/67843/videos> (accessed on 06.07.2022)

² Russia claims key city in punishing conquest of eastern Ukraine (published on 03.07.2022) The Washington Post URL: <https://www.washingtonpost.com/world/2022/07/03/lysychnsk-luhansk-russia-ukraine-war/> (accessed on 06.07.2022)

³ The 295th day of hostilities (published on 15.12.2022) Vazhnyi % percent” Telegram-channel. URL: <https://t.me/VazhnyProcent/141> (accessed on 18.01.2023)

⁴ Records of the shelling effects in the Kuibyshevskiy district of Donetsk on November 27, 2022 (published on 27.11.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12091 (accessed on 18.01.2023)

Other egregious incidents include the following:

On December 1, 2022, two kindergartens, a hotel and a number of residential buildings were damaged as a result of shelling by the UAF⁵.

On December 4, 2022, a kindergarten, office buildings, dormitories, and residential buildings got under fire⁶.

On December 9, 2022, several buildings of the Donetsk National Technical University were also damaged, a man born in 1979 was wounded⁷.

However, targeted shelling of medical institutions became the most criminal and dishonorable. Among others, Donetsk Clinical Territorial Medical Association named after Kalinin (DoCTMA) was affected.

Thus, on **December 11, 2022 at 05:54** Moscow time, the Voroshilovskiy and Kalininskiy districts of Donetsk came under artillery fire⁸. As a result of the shelling in the Kalininskiy district, damage was sustained by the 8th and building No. 11s of the DoCTMA named after M. Kalinin in Ilyicha Ave.; in the Voroshilovskiy district, the Donetsk State Academic Opera and Ballet Theater named after A.B. Solovyanenko in Artioma St., apartment buildings in 35, and 37, Universitetskaya St., 26, and 31 Pushkina Blvd., (fire detected), 33 Pushkina Blvd. (direct hit on the roof), 86, Artioma St., 122, and 137, Postysheva St., and 24, Teatralny Ave⁹.

On **December 18, 2022, at 20:14** Moscow time, the Voroshilovskiy and Kalininskiy districts of Donetsk¹⁰, were again shelled, as a result of which a direct hit on building No. 6 was recorded, buildings No. 5, 7 and 8 of the Kalinin DoCTMA in Ilyicha Ave.; apartment buildings in 99, 50 years of the USSR St., 158, Gorky St.,

⁵ Records of the shelling effects in the Voroshilovskiy district of Donetsk on December 01, 2022 (published on 01.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12198 (accessed on 18.01.2023)

⁶ Records of the shelling effects in the Voroshilovskiy district of Donetsk on December 01, 2022 (published on 14.03.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12321 (accessed on 18.01.2023)

⁷ Records of the shelling effects in the Voroshilovskiy and Kievskiy districts of Donetsk on December 09, 2022 (published on 09.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12543 (accessed on 18.01.2023)

⁸ Shelling was recorded from the UAF side in the direction (published on 11.12.2022) "Online DPR JCCC" Telegram Channel. Telegram channel. URL: https://t.me/online_dnr_sckk/19904 (accessed on 18.01.2023)

⁹ Additional information received about the damage caused by the UAF shelling of the cities of the Republic (published on 11.12.2022) "Online DPR JCCC" Telegram Channel. Telegram channel. URL: https://t.me/DNR_SCKK/12587 (accessed on 18.01.2023)

¹⁰ Shelling was recorded from the UAF side in the direction (published on 18.12.2022) "Online DPR JCCC" Telegram Channel. URL: https://t.me/online_dnr_sckk/20151 (accessed on 18.01.2023)

148, Chelyuskintsev Str.¹¹. As a result of this shelling, in DoCTMA **two patients were injured, one of them (who received severe craniocerebral and thoracic injuries) later died**¹².

The next day, **December 19, 2022**, at 22:40 Moscow time DoCTMA was again subjected to artillery fire¹³. As a result of a direct shell hit, three floors of the polyclinic (building No. 10) of the DoCTMA collapsed. In addition, there was a direct hit followed by a fire in the sports building of the State Educational Institution of Higher Professional Education M. Gorky DonNMU in Ilyicha Ave.; one of the rockets exploded right next to the office of the humanitarian mission of the International Committee of the Red Cross in Kapitana Ratnikova St., the façade and glazing of the office were damaged; there was also a shell hit in the territory of the Children's Day Care Center No. 405 in Kapitana Ratnikova St.; and some other buildings were damaged in Ilyicha Ave., and Kapitana Ratnikova St¹⁴.

¹¹ Additional information received about the damage caused by the UAF shelling of the cities of the Republic (published on 18.12.2022) "The DNR in JCCC: facts of Ukraine's war crimes" Telegram channel URL: https://t.me/DNR_SCKK/12892 (accessed on 18.12.2023)

¹² As a result of the shelling in the Kalininskiy district of Donetsk, one civilian died and another was injured (published on 19.12.2022) Komsomolskaya Pravda in Donetsk. URL: <https://www.donetsk.kp.ru/online/news/5062074/> (accessed on 18.01.2023)

¹³ Shelling was recorded from the UAF side in the direction (published on 19.12.2022) "Online DPR JCCC" Telegram Channel. URL: https://t.me/online_dnr_sckk/20193 (accessed on 18.01.2023)

¹⁴ Ukrainian army bombs Kalinina hospital in Donetsk for two days in a row (published on 24.12.2022) MR Online. URL: <https://mronline.org/2022/12/24/ukrainian-army-bombs-kalinina-hospital-in-donetsk-for-two-days-in-a-row/> (accessed on 18.01.2023)

INCIDENT LOCATION

This investigation will examine in detail the shelling of the Donetsk Clinical Territorial Medical Association named after Kalinin on December 11, 18 and 19, 2022.

After examining the incident location in the Kalininskiy district of Donetsk, talking with witnesses of the shelling, and collecting materials from open sources, we managed to identify **19** artillery shell hits, namely on December 11 – two shell hits, on December 18 – four shell hits, and on 19 December – 13 shell hits. All of them have been explored and mapped using the Yandex Maps service (see Fig. 3, Fig. 4, Fig. 5).

December 11, 2022

Shell hit 1 The projectile hit the asphalt in front of the northern side of the building No. 11 of the Kalinin DoCTMA (admission department of neurosurgery, department of neurosurgery No. 1, neurosurgery resuscitation), approximately 20-30 meters north-east from the entrance to the pharmacy located in this building. As a result of the projectile detonation, the fragments damaged the façade of the north side of the building, the glazing, and, according to the hospital staff¹⁵, the oxygen line. Also, the facing of the building No. 6 of the DoCTMA was damaged by fragments. A crater remained on the asphalt, which looks like a round depression in the asphalt, from the north-western side of the building fragmentation grooves are visible on the asphalt (see Fig. 6).

The photo, published an hour after the shelling, shows that fragments of the projectile remained at the site of the explosion – the guided missile part and the stabilizer unit, characteristic of the projectiles fired from the Grad MLRS (see Fig. 7).

¹⁵ Ukrainian troops shelled the Kalinin hospital in Donetsk, the roof of one of the buildings was damaged as a result of a direct hit by a Grad rocket (published on 11.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/188334 (accessed on 18.01.2023)

Shell hit 2 The second projectile landed about 100 meters south-east of shell hit 1. With a direct hit, it pierced through the roof of the building No. 8 of the Kalinin DoCTMA (see Fig. 8). The remains of the propulsion unit continued to move along the projectile flight path, and, having slightly changed the path, hitting the separation partition, finished moving, damaging the wall on the stair landing, where they were found (see Fig. 9).

December 18, 2022

Shell hit 1 is located in the asphalt pavement from the northern part of the building No. 12 of the Kalinin DoCTMA (Diagnostic Center). The projectile penetrated deep into the soil, resulting in a camouflet (an underground explosion of a mine to destroy enemy underground structures, and an explosion of an artillery projectile (bombs, mines) underground without throwing out earth and fragments - *from the explanatory dictionary of S.I. Ozhegov*¹⁶). The projectile explosion only compressed the soil and damaged the asphalt pavement about five meters long directly from the point of impact (see Fig. 10).

Shell hit 2 One of the projectiles detonated, hitting the window of one of the rooms on the second floor of the building No. 6 of the DoCTMA (pharmacy, departments of physiotherapy, neurosurgery No. 2 and No. 4, pediatric neurosurgery, and vascular neurosurgery) (see Fig. 11). Shell hit 2 was on the east side of the building façade, about 15 meters from the main entrance.

As a result of the explosion, the ward of one of the neurosurgery departments was destroyed, the neighboring premises were damaged, two patients were injured, one of whom died from his injuries. Also, the glazing and the eastern side of the façade of the DoCTMA building No. 5 (departments of cardiology, cardiac surgery, gynecology, obstetric resuscitation, newborns and maternity departments), located opposite the building No. 6 (see Fig. 12).

¹⁶ KAMUFLET Ozhegov's explanatory dictionary online. URL: <https://slovarozhegova.ru/word.php?wordid=10563> (accessed on 26.01.2023)

At the point of the impact, a fragment of a propulsion unit was found under the rubble, presumably it was a projectile of Grad MLRS or its Czech counterpart RM-70/RM-70 Vampire MLRS (see Fig. 13).

Shell hit 3 This shell hit was a camouflet. The shell landed near the canteen at 16, Ilyicha Ave., in the territory of the M. Gorky Donetsk National Medical University, deepened into the soil, significantly damaging only the asphalt pavement above the projectile explosion site (see Fig. 14), as in the case of shell hit 1.

Shell hit 4 Another shell hit the roof of the building No. 7 of the DoCTMA (department of radioisotope diagnostics, radiation safety service, family counseling department, and clinical laboratory), damaging the glazing, cladding and interior of the building. Shell hit 4 was located in the eastern part of the roof, near the eastern side of the building façade (see Fig. 15).

December 19, 2022

Shell hit 1 The projectile hit the asphalt pavement in the pedestrian zone directly at the northern side of the building of dormitory No. 3 of the M. Gorky Donetsk National Medical University, M. which is territorially located near the intersection of Krasnoflotskaya St. and Goryachkina St. The projectile went deep into the soil and detonated in it under the window of the building, damaging the asphalt pavement, and, according to eyewitnesses, the room inside the dormitory No. 3 (see Fig. 16).

Shell hit 2 The shell fell about five meters from the north-east corner of the sports and recreation complex and about 15 meters from the western part of building No. 1, in which fragments damaged the glazing and cladding of the building. A crater from the projectile looks like a round depression in the ground, from the north-western side of the building fragmentation grooves are visible on the ground surface (see Fig. 17).

Shell hit 3 A direct hit of the projectile damaged the building of the sports and recreation complex of the M. Gorky DonNMU. The projectile hit the western wall

of the building at the roof level, then penetrated another wall on the stair landing on the third floor. As a result of the projectile detonation, a fire broke out, and the glazing, ceilings, walls of the office on the 3rd floor were also damaged (see Fig. 18, Fig. 19). At the scene of the incident, a fragment of a propulsion unit and a stabilizer unit, characteristic of the Grad MLRS projectiles, were found Fig. 20, Fig. 21, Fig. 22).

Shell hit 4 This shell hit was a camouflet. The shell landed about 80 meters south of shell hits 2 and 3 - directly at the western wall of the transformer substation. As in the case of shell hit 1, the projectile dug into the ground and detonated with a delay, which resulted in the damage of the reinforced concrete slab at the base of the substation (see Fig. 23).

Shell hit 5 In this case, the projectile also detonated about 80 meters south of the previous shell hit, hitting the ground about 20 meters from the western part of building No. 3 of the M. Gorky DonNMU, and about 30 meters from the south side of the canteen, located in the territory of the university (see Fig. 24). As a result of the projectile detonation, the glazing and cladding of the above buildings were damaged. The place of the projectile detonation looks like a round depression in the ground, from the north-western side of the building fragmentation grooves are visible on the ground surface.

Shell hit 6 Another shell hit the roof of the DoCTMA building No. 10 of the (polyclinic, administration), broke through a wall and detonated with a delay inside the building, which resulted in the damage of window blocks, glazing, a wall at the level of the 4th floor, and the inter-floor ceiling between the 3rd, 2nd floors, and partly between the 2nd and 1st floors, the façade of the building in the courtyard was also destroyed (see Fig. 25).

A cylindrical hollow metal object was salvaged from under the wreckage; it was identified as part of a propulsion unit, presumably of a Grad MLRS projectile (see Fig. 26). The diameter of the object is approximately 12.5 cm, the length of the fragment is up to 1 m.

Shell hit 7 In this case, the projectile detonated a few meters from a grocery store near the intersection of Ilyicha Ave., and Serova St. (see Fig. 27). The projectile crater looks like a round depression nearly 5-7 cm deep with fragmentation grooves diverging to the north-west. As a result of the projectile explosion, the façade and glazing of the store and the cafeteria next to it were damaged.

Shell hit 8 The projectile hit the western wall at the level of the basement of the non-functioning building No. 15 of the DoCTMA (positron emission tomography) about 80 meters from the place of shell hit 6, damaging the façade of the building and the gatehouse nearby (see Fig. 28).

Shell hit 9 occurred in the private sector at 5, Barvenkovskaya St. A house was destroyed as a result of a direct projectile hit (see Fig. 29).

Shell hit 10 Two projectiles fell down in the territory of the garage cooperative in Kapitana Ratnikova St. One of them exploded right next to one of the garages, and as a result, the garage was destroyed, some of its fragments were thrown 40 meters from the garage location. At the place of the impact, a propulsion unit, presumably of the Grad MLRS, was found in the crater (see Fig. 30). Underground communications were damaged as a result of the detonation of the second projectile (see Fig. 31). Also, the shelling resulted in the damage of glazing in the nearby buildings, including the department of the Kalininskiy thermal section of the Donbassteploenergo State Enterprise at 25a, Ilyicha Ave.

Shell hit 11 Another projectile hit the ground near the north-east corner of an apartment building in 6, Kapitana Ratnikova St. – just 30-40 meters south-west of shell hit 10 (see Fig. 32). At the place of impact, a crater was formed resembling a round depression, and fragmentation grooves on the soil surface on the north-western side of the depression. As a result of the projectile explosion, fragments damaged the balconies, the cladding and glazing of the building.

Shell hit 12 Another shell hit was in the territory of the Children's Day Care Center No. 405 at 18a, Kapitana Ratnikova St (see Fig. 33). The projectile fell between the fence and the gazebo in the southern part of the territory, as a result of the detonation, the gazebo was destroyed, and the glazing of the day care center and

residential buildings was damaged at 8, 10, 12, 14, 16, and 18, Kapitana Ratnikova St.

Shell hit 13 One projectile exploded right next to the office of the humanitarian mission of the International Committee of the Red Cross in Kapitana Ratnikova St. Unfortunately, it was impossible to get into the office, there are also no photo or video materials with recorded damage in open sources. According to the ICRC delegation in Moscow, a building and several motor vehicles were damaged as a result of the shelling, none of the ICRC employees were injured¹⁷.

The ICRC condemned the shelling of its office in Donetsk, called for respect for humanitarian activities in the area of the special military operation, and recalled the need to protect medical personnel and organizations providing assistance to the civilian population. The corresponding statement of the ICRC was distributed on December 21, 2022 in Geneva in connection with the damage due to the shelling by the Ukrainian Armed Forces of the organization's office in Donetsk¹⁸.

¹⁷ The International Committee of the Red Cross condemned the shelling of the office in Donetsk (published on 20.12.2022) TASS. URL: <https://tass.ru/mezhdunarodnaya-panorama/16641053> (accessed on 23.01.2023)

¹⁸ Russia-Ukraine international armed conflict: ICRC office damaged by shelling (published on 21.12.2022) International Committee of the Red Cross URL: <https://www.icrc.org/en/document/russia-ukraine-international-armed-conflict-icrc-office-damaged-shelling> (accessed on 23.01.2023)

WEAPON TYPE

Projectile debris

At the shell hit 1 on December 11, 2022 after the shelling, a deformed fragment of a MLRS projectile was found in the form of a cylindrical object deepened into the crater; we also found a fragment of the rear part of the projectile, which we identified as the guided missile part of the MLRS projectile and the stabilizer unit, respectively (see Fig. 7). Similar fragments were found on the same day at the site of shell hit 2 (see Fig. 9).

It is worth noting that the guided missile part of the 122-mm projectile has a green tint, which is typical for projectiles manufactured in Eastern Europe (for example, the former Czechoslovakia), while the body of the warhead of the 122-mm projectile intended for the Grad MLRS is painted with gray enamel or dark gray oil paint¹⁹. This is especially clearly seen on the fragments found at the site of shell hits, with fragments having a green tint (see Fig. 34, Fig. 35).

After the shelling on December 18, 2022 at the site of shell hit 2, a deformed fragment of the projectile was salvaged from under the rubble; we identified as the guided missile part of the MLRS projectile, which also has a characteristic green tint (see Fig. 13).

At the site of shell hit 3 of December 19, 2022 a stabilizer block of a 122 mm projectile was found (see Fig. 21, Fig. 22). It has holes of a specific shape, located at the place where the fin is attached to the body, which is typical for Grad MLRS projectiles. To confirm this argument, we attach a layout of the stabilizer unit for the Grad MLRS projectile having a caliber of 122 mm, which shows holes of identical shapes in the cross-section (see Fig. 36). In addition, the head of the administration of Donetsk, Aleksey Kulemzin, published a photo on his Telegram channel from the site of shell hit 3 (see Fig. 37), where seven holes, called a nozzle, are clearly visible

¹⁹ Ammunitioner – 122 – 9M22. Ammunitioner. URL: http://soviet-ammo.ucoz.ru/index/122_9m22/0-138 (accessed on 30.01.2023)

on the stabilizer unit; they are intended for the outflow of gases from the jet chamber, the presence of which is characteristic of 122-mm projectiles.

Also, from under the rubble at the site of shell hit 6 of December 19, 2022 a hollow metal object of a cylindrical shape was salvaged, which we identified as part of a missile propulsion unit, presumably of a Grad MLRS projectile, about 1 m long. To determine the diameter of this object, we used a DOOGEE V20 smartphone in a protective case, measuring its dimensions with a scale ruler: it was 17.5 cm high, and 8.4 cm wide. Thus, the diameter of the part of the missile propulsion unit was approximately 12.5 cm (see Fig. 38).

It is worth paying attention to the degree of damage due to the projectile detonation – the intermediate ceilings between the 3rd and 2nd floors, and partially between the 2nd and 1st floors, were damaged. In similar sites of shell hits – No. 2 of December 11, 2022 and 2 of December 18, 2022 – damage to the buildings was caused to a lesser extent. Thus, the DPR representative office in the JCCC informed that “judging by the nature of the damage to the DoCTMA building No. 10, presumably, the shelling was carried out by EXR-1222 Slovak missiles of increased striking power²⁰. In addition, missiles of this type can be fired from any 122-mm MLRS launcher. They are distinguished from the original missiles for the Grad MLRS by the large mass of the warhead, which provides a greater striking power and the scale of destruction.

It should be noted that similar missile fragments were found at the site of shell hit 3 (see Fig. 20) and in the crater at the site of shell hit 10 of December 19, 2022 Using a smartphone, we determined the diameter of the projectile fragment from the site of shell hit 10 – approximately 12.5 cm (see Fig. 39), as was the case with the propulsion unit part from shell hit 6.

²⁰ The DPR conceives that high-power rockets were used during the shelling of a hospital in Donetsk (published on 20.12.2022) TASS. URL: <https://tass.ru/proisshestiya/16636365> (accessed on 30.01.2023)

Earlier, according to the DPR representative office in the JCCC, on December 15, 2022, the armed formations of Ukraine had already used EXP-122 shells during shelling of the Voroshilovskiy district of Donetsk²¹.

Considering all of the above, we came to the conclusion that the projectile fragments we studied can correspond to both the original Soviet M-21OF projectile of the 9M22 index for Grad MLRS, and its Slovak modification EXP-122²², and its Czech JROF modification for the RM -70/RM-70 Vampire MLRS (the firing range of high-explosive fragmentation projectiles varies from 1.6 km to 20 km).

M-21OF Projectile

Since the original Soviet M-21OF projectile for the Grad MLRS serves as the basis of the shells under consideration, we will consider its performance characteristics (see Fig. 40, Fig. 41).

In the front part of the 122-mm M-21OF, a warhead is located behind the head contact fuse; steel housing of the propulsion unit adjoins to this warhead. Due to the large elongation, the housing consists of two cylindrical sections connected by a thread. The nozzle unit includes a central and six peripheral nozzles. In the supersonic part, the nozzles have the shape of a cone with an angle of 30°. The diameter of the critical section of the nozzle is 19 mm, the cut is 37 mm.

A 0.3 mm thick heat-shielding coating applied to the inner surface of the propulsion unit body not only protects the steel housing from heating and a corresponding decrease in strength, but also significantly reduces the energy loss of the burning fuel and contributes to obtaining a high specific impulse and an increased burning rate. The charge of solid fuel for technological reasons is also made of two semi-charges. In this case, the tail semi-charge has a larger gap between

²¹ Records of the shelling effects in the Voroshilovskiy district of Donetsk on December 15, 2022 (published on 15.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12817 (accessed on 30.01.2023)

²² The Rocket Artillery Reference Book. Norsk rapport URL: <https://ffipublikasjoner.archive.knowledgearc.net/bitstream/handle/20.500.12242/2257/09-00179.pdf> (accessed on 30.01.2023)

the housing walls and the fuel, since it is necessary to provide a sufficient flow area for the fuel combustion products of the front and tail semi-charges.

Due to the fact that during long-term storage of projectiles in a horizontal position, deformation of the propulsion unit case was not excluded, the fuel charge was separated from the walls of the propulsion chamber by a gap of 4 mm for the head half-charge and 9 mm for the tail one. The semi-charges were fixed by means of six “slips” sized 50 x 10 mm, made from the same fuel, glued onto each of them. The ends of the semi-charges were armored with glued washers made of nitro-linoleum.

The RSI-12M formulation, consisting of 56% xylydine, 26.7% nitroglycerin, 10.5% dinitrotoluene, 3% centralite, was used in the fuel charge. The composition of the charge also included catalysts and processing additives. An igniter with 80 g of KZDP-1 coarse-grained smoke powder and 2 g of DRP-1 gunpowder, stored in separate percale bags was located between the semi-charges. The current for two MB-2N electric igniters was supplied through wires laid through the central nozzle and the tail semi-charge channel. The total mass of two semi-charges with “slips” and washers was 20.6 kg, the body of the missile part weighed 24.5 kg (26.4 kg with stabilizers).

At the end of the sixties of the 20th century, the charge manufacture from a denser RST-4K fuel was worked out, which made it possible, while maintaining the required weight, to somewhat reduce the size and unify the geometry of the semi-charges. Instead of glued “slips”, small ledges were used - ridges on the outer surface, formed in the process of making checkers. Somewhat later, the manufacture of fuel semi-charges was mastered using a special recipe, where the products of the processing of fuel charges extracted from obsolete missiles with an expired warranty period were used. Such charges with ridges, without glued “slips”, were manufactured from alteration recipes in 1975-1980.

The powder charge of the projectile is ignited by pyro-igniters, triggered by current pulses from the current distributor of the fire control system. The duration of a salvo of one BM-21 is 20 seconds. If necessary, a salvo could be fired rather from

a remote-control panel taken several tens of meters away than from the cockpit. The M-210F (9M22U) projectile with a high-explosive fragmentation warhead is the most widely used type of BM-21 MLRS projectiles. The length of this projectile with the MRV-U fuse is 2.87 m. The weight with the fuse is 66.4 kg, the warhead weighs 19.18 kg, and the explosive weighs 6.4 kg.

Powder charge (RSI gunpowder – 12 m) weighing 20.45 kg provides the highest projectile speed of 690 m/s. The fuse is cocked after leaving the guide at distances of 150-450 m from the combat vehicle. The nature of the projectile action at the target depends on the installation of the fuse: with an instantaneous actuation, it is predominantly of a fragmentation type, with a delayed actuation, it is predominantly high-explosive²³.

According to its technical characteristics, the M-210F projectile has three maximum firing ranges (depending on the use of various brake rings), which are 12,000, 16,000 and 20,400 meters.

Deliveries of 122-mm Multiple Launch Rocket Systems and Ammunition to Ukraine

The first 122-mm MLRS missiles were delivered by the Czech Republic **in April 2022**. Then Ukraine received more than 20 Czech RM-70 multiple launch rocket systems²⁴ with the necessary ammunition.

In early June 2022, it became known that Greece had “transferred or would transfer” to Ukraine an “incredible amount” of weapons and ammunition for the needs of the Armed Forces of Ukraine, including 2,100 122-mm projectiles²⁵.

²³ BM-21 Grad MLRS. Soldat.pro website. URL: <https://soldat.pro/2018/07/06/rszo-bm-21-grad/> (accessed on 30.01.2023)

²⁴ #Ukraine: A RM-70 122mm multiple rocket launcher was spotted in Ukraine for the first time (published on 12.05.2022) “Ukraine Weapons Tracker” Twitter Account. URL: https://twitter.com/UAWeapons/status/1524811909710610432?t=Y5DOD_iMsLsaA3c2BjYsXg&s=35 (accessed on 26.01.2023)

²⁵ Αυτά είναι τα όπλα που εκχώρησε η Ελλάδα στην Ουκρανία: Απίστευτες ποσότητες – «Σκοτώθηκαν εκατοντάδες Ρώσοι από την χρήση τους» (published on 04.06.2022) Pronews.gr URL: <https://www.pronews.gr/amyna-asfaleia/enoples-sygekroyseis/ayta-einai-ta-opla-pou-ekxorise-i-ellada-stin-oukrania-skotothikan-ekatonrades-rosoi-apo-tin-xrisi-tous/> (accessed on 16.02.2023)

On June 16, 2022, Slovakia handed over thousands of projectiles for the Grad MLRS²⁶.

According to information from open sources, **in May or June 2022**, the Czech Republic purchased the Grad MLRS from Bulgaria and delivered to Ukraine. Indirectly, this information is confirmed by the words of the former head of the Bulgarian state military export company Kintex, Alexander Mikhailov, who resigned in June 2022. He reported on the exports for 2 billion Euros since the beginning of the SMO and mentioned the supply of missiles for the Grad MLRS to Ukraine²⁷.

In the first half of **July 2022**, the UAF received upgraded versions of the RM-70 MLRS called RM-70 Vampire 4D from the Czech Republic, these systems are equipped with a Tatra T-815-7 chassis and a new digital fire control system²⁸.

On October 19, 2022, the Minister of Defense of the Czech Republic, Yana Chernokhova, announced a new package of military assistance to Ukraine, but did not specifically say what kind of assistance she was talking about²⁹.

On October 26, 2022, information appeared in the media about the supply of 24 Grad MLRS launchers, and ammunition by Poland to Ukraine³⁰.

²⁶ Slovaks give Mi helicopters, Grad rockets to Ukraine (published on 16.06.2022) Reuters URL: <https://www.reuters.com/world/europe/slovaks-give-mi-helicopters-grad-rockets-ukraine-2022-06-16/> (accessed on 30.01.2023)

²⁷ Bulgaria to the rescue: How the EU's poorest country secretly saved Ukraine (published on 18.01.2023) POLITICO URL: <https://www.politico.eu/article/bulgaria-volodymyr-zelenskyy-kiril-petkov-poorest-country-eu-ukraine/> (accessed on 26.01.2023)

²⁸ #Ukraine: It appears the Ukrainian army received from Czechia not only classic Czechoslovak RM-70 multiple rocket launchers (published on 11.07.2022) "Ukraine Weapons Tracker" Twitter Account. URL: https://twitter.com/UAWeapons/status/1546455028554244096?t=ZTIWdS1m_M6y6ublgATeTQ&s=19 (accessed on 26.01.2023)

²⁹ Držíme slovo a stále podporujeme Ukrajinu vojenskými dodávkami (published on 19.10.2022) "Jana Černochová" Twitter Account. URL: https://twitter.com/jana_chnochova/status/1582703322825252869?t=txiucE59CTxE8P_jbo8GvA&s=19 (accessed on 26.01.2023)

³⁰ Poland sent old BM-21 Grad to Ukrainian militants (published on 25.11.2022) Russian Weapons - Rossiyskaya Gazeta. URL: <https://rg.ru/2022/10/26/polsha-otpravila-ukrainskim-boevikam-starye-bm-21-grad.html> (accessed on 26.01.2023)

DETERMINATION OF THE SHELLING SECTOR

Direction

At the site of shell hit 1 of December 11, 2022 the point of the projectile entry is clearly visible, by which we managed to determine the azimuth of the shelling direction, making 307 degrees (see Fig42).

At the site of shell hit 2 of December 11, 2022 in the DoCTMA building No. 8, the projectile left physical traces during the fall: a pierced roof, a damaged separation partition, and the immediate final place of the fall of the guided missile part of the projectile – part of the wall at the level of the stair landing. After examining them, we displayed the approximate trajectory of the projectile fall: first, it pierced the roof, tangentially touched the separation partition, and then hit the wall on the stair landing (see Fig. 43). Considering this trajectory, and a conditional horizontal surface relative to the final place of the trajectory, we can state that the angle of incidence of the projectile was approximately 58 degrees (see Fig. 44). This suggests that the shelling could be carried out from a distance close to the maximum.

Shell hits 1 and 3 of December 18, 2022 are camouflets. In these cases, the points of the projectile entry into the ground and the area of its detonation, which has an elongated shape, are clearly defined (shell hit 1 is a good example) Thus, these craters allow us to determine the direction from which the shelling was carried out that day. In this case, the azimuth of shell hit 1 was 307 degrees, the azimuth of shell hit 3 was 312 degrees (see Fig. 45).

In the case of shell hit 4 on December 18, 2022 the projectile pierced the roof the DoCTMA building No.7, and left a trace from a collision with it during the fall in the wall above the window block. These damages allow us to assert that the angle of incidence of the projectile was approximately 60 degrees (see Fig. 46), which also, in turn, supports the assertion that the shelling was carried out from a distance close to the maximum.

In the sites of shell hits 2, 5, 7 and 11 dated December 19, 2022 clear traces from the detonation of shells remained on the surface, they are identified as craters from shelling at a high incidence angle (see Fig. 47). Using the example of shell hit 2, we compared in detail the formed crater with the crater from shelling at a high angle of impact and proved their compliance. This enabled us to determine the direction from which the shelling was carried out using the fragmentation grooves method (see Fig. 48). In this case, the azimuth was 307 degrees. We also determined the approximate angle of incidence of the projectile – 58 degrees (see Fig. 49).

Having examined similarly the craters at the sites of shell hit 5 (see Fig. 24), 7 (see Fig50) and 11 (see Fig51), we determined the azimuth of the shelling direction - 305, 308 and 305 degrees, respectively. In addition, at the site of shell hit 11, we also managed to determine the approximate angle of incidence of the projectile - 55 degrees (see Fig. 52).

Let us pay attention to the nature of the destruction at the site of shell hit 6 of December 19, 2022 – the DoCTMA building No. 10. The wall at the level of the third floor was destroyed in the building, the intermediate ceilings between the 3rd and 2nd floors and partially between the 2nd and 1st floors were damaged. When firing from the MLRS, such damage could occur when the projectile flew along a arching trajectory (the trajectory obtained at elevation angles greater than the angle of greatest firing range, i.e., greater than 45 degrees) (see Fig. 53). This also suggests that the shelling could be carried out from a distance close to the maximum.

It is also worth paying attention to the site of shell hit 10 of December 19, 2022 (see Fig. 30). In this case, the projectile fell at an angle close to perpendicular, which also indicates firing along an arching trajectory.

The camouflet at the site of shell hit 4 of December 19, 2022 also made it possible to determine the shelling direction. Thus, the azimuth of the shelling direction was 303 degrees (see Fig. 35).

Considering the azimuths that we have determined, the difference between which does not exceed 10 degrees, for further investigation we will take the **average azimuth** as the shelling direction, **which is approximately 307 degrees**. Thus, it

can be concluded that the shells were fired from the northwest to the southeast along an azimuth of 307 degrees.

Firing range

In accordance with the performance characteristics of the M-12OF projectile, the maximum firing range in our case is up to 20 km. In addition, we know that the projectile collision angles are in the range of approximately 55 to 60 degrees. Consequently, the projectiles were fired from the gun at an angle close to 45 degrees, i.e., the projectiles were fired at the maximum distance for the used powder charge.

However, based on the data of the firing tables of Soviet-style guns³¹, it can be stated that artillery fire conducted with an exit angle close to 45 degrees is not fired from a distance of less than 10 km.

In addition, to reduce the dispersion of projectiles in rocket artillery, replaceable brake rings are used, which are installed on the head of the projectile. This also shortens the firing range. Thus, there are three ballistic versions of the projectile: without a brake ring, with a small brake ring and with a large brake ring. Note that the range of projectiles for the Grad MLRS with a large brake ring is at least 10 km.

Based on the direction of the projectiles we determined (307 degrees with an error of ± 15 degrees) and the firing range (10-20 km), we can map the sector from which the shelling of the Donetsk Clinical Territorial Medical Association named after Kalinin on December 11, 18 and 19, 2022. In addition, based on the maps of the armed confrontation³² in Ukraine, we can plot the line of demarcation on the map (see Fig. 54). Thus, the mapped shelling sector is divided by the line of demarcation approximately in the middle. The version about the attack of the RF Armed Forces on its medical facility seems extremely doubtful. Therefore, a sector between the settlements of Severnoye and Pervomayskoye is the most likely place where the gun

³¹ Ministry of Defense of the USSR Tables of firing by M-21OF high-explosive fragmentation projectiles. 3Rd edn., Voenizdat, 1985. 110 p.

³² The Map of the War in Ukraine. See where the fighting has been in recent days by meduza. MapHub URL: <https://maphub.net/meduza/map-a-temp-1> (accessed on 13.02.2023)

that shelled DoCTMA seems to be located. It is also worth considering that in the vicinity of Tonenkoye-Severnoye settlements, UAF built artillery positions and adjusted guns already back in 2015.

MILITARY PRESENCE

On November 12, 2022, President of Ukraine and Supreme Commander of the Armed Forces of Ukraine Volodymyr Zelensky announced that the following brigades were deployed in the combat zone: “The first and second battalions of the 36th Independent Naval Infantry Brigade, the 79th Air Assault Brigade, the 72nd Separate Mechanized Brigade named after the Black Zaporozhians, the 68th Separate Jager Infantry Brigade, the 110th Independent Motorized Brigade, the 56th Independent Motorized Infantry Brigade and the 55-th Independent Artillery Brigade “Zaporozhian Sich”, which supports everyone there”³³. Nearby the sector we are considering, the presence of several brigades was recorded - the 36th INIBr, the 110th IMBr, the 56th IMIBr and the 55th IABr; however, the 122 mm MLRS are in service with the 36th ObrMP (Grad MLRS)³⁴ and the 110th IMBr (RM-70/RM-70 Vampire MLRS)³⁵.

Units of the 110th IMBr are located in the front sector from Opytnoye settlement to New-York settlement, including one of the main battlefields - Avdeyevka settlement³⁶. A video of the 110th IMBr (made in the fall of 2022) was published in open sources; it shows the movement of the RM-70 MLRS from Avdeyevka to the vicinity of Orlovka to conduct artillery fire³⁷. This place is located at a distance of only 1-2 km from the sector under consideration.

In open sources, the first mention of the presence of the 36th Brigade in the sector we are considering, namely in the area of Vodyanoe settlement, is dated on

³³ There’s just a hell: Zelensky about the Zelensky about the defense of Donetsk Land (published on 12.11.2022) Public | News URL: <https://suspilne.media/315528-tam-prosto-peklo-zelenskij-pro-oboronu-doneccini/> (accessed on 13.02.2023)

³⁴ Jet gunners showed how they destroy the Russians at the front (video) (published on 20.02.2022) Chas. News URL: <https://chas.news/news/artileristi-reaktivniki-pokazali-yak-nischat-rosiyan-na-fronti-video> (accessed on 14.02.2023)

³⁵ Czech “Vampires” destroy the invaders with hundred-kilogram shells on the front line (published on 16.11.2022) TSN. URL: <https://tsn.ua/ato/cheski-vampiri-na-peredoviy-nischat-okupantiv-stokilogramovimi-snaryadami-2203177.html> (accessed on 14.02.2023)

³⁶ Poroshenko brought gifts to the 110th OMBr (published on 12.11.2022) YouTube Video hosting. URL: <https://youtu.be/25U5O4kYVfc> (accessed on 15.02.2023)

³⁷ The movement of Czech Grad from the turn in the AKHZ sector toward Orlovka (published on 03.02.2023) “Yasynovataya, Donbass is in the line of fire. Telegram Channel. URL: <https://t.me/DonbassYasynovatayanaliniiOgnia/36346?single> (accessed on 15.02.2023)

November 15, 2022³⁸. Another couple of mentions dates back to January 15, 2023³⁹ and January 25, 2023⁴⁰ also in the area of Vodyanoe settlement. With a high degree of probability, this brigade was deployed there in December 2022.

A brigade artillery group is included in the structure of the 36th Independent Naval Infantry Brigade. It includes a rocket artillery battalion, armed with Grad MLRS. Thus, the video digest of the UAF General Staff dated December 20, 2022, shows a video fragment in which marine infantry artillerymen are firing from the Grad MLRS at night (see Fig. 55).

It is also worth noting that on December 21, 2022, the Ministry of Defense of the Russian Federation reported that Russian artillerymen had destroyed a combat vehicle of Grad multiple launch rocket system nearby Vodyanoe settlement⁴¹.

At the same time, it should be noted that since 2015, in this sector have already the UAF has equipped fortified artillery positions, with established communication links, and the organized supply of weapons, ammunition, fuel, and food.

As for the persons who could order the shelling of a civilian medical facility, and civilians using 122-mm projectiles, the commander of the 36th INIBr, Colonel Viktor Sikoza, is primarily responsible for this (see Fig. 56).

³⁸ Offensive in the Donetsk direction: the situation as of 13.00 November 15, 2022 at 13.00 (published on 15.11.2022) “Rybar” Telegram Channel. URL: <https://t.me/rybar/41165> (accessed on 15.02.2023)

³⁹ The fight against the invaders: Soldiers of the 36th INIB destroyed an assault column of Russians in Donetsk region. VIDEO (published on 25.01.2023) CENSOR.NET website. URL: https://censor.net/ua/video_news/3395641/voyiny_36obmp_znyschyly_shturmovu_kolonu_rosiyan_na_donechchyni_video (accessed on 15.02.2023)

⁴⁰ Chronicle of a special military operation for January 24, 2023 (published on 25.01.2023) “Rybar” Telegram Channel. URL: <https://t.me/rybar/42960> (accessed on 15.02.2023)

⁴¹ Status update of the Ministry of Defense of the Russian Federation on the conduct of a special military operation in the territory of Ukraine (21.12.2022 r.) (published on 21.12.2022) “Russia’s Ministry of Defense” Telegram Channel. URL: https://t.me/mod_russia/22804 (accessed on 15.02.2023)

CONCLUSIONS

It follows from the above that on December 11, 2022, at 05:54 (MSK), on December 18, 2022, at 20:14 (MSK) and on December 19, 2022, at 22:40 (MSK) Donetsk Clinical Territorial Medical Association named after Kalinin was subjected to artillery fire from the Grad MLRS. The shells flew in a direction from north-west to south-east (azimuth 307 degrees, error making ± 15 degrees).

All shell hits fell on densely populated residential areas of the city and led to damage to civilian objects, death and injury to civilians. Thus, the principles of selectivity and proportionality were violated.

As a result of the analysis of news videos and information from the Internet, it was found that the Rocket Artillery Battery of the Armed Forces of Ukraine could be located in the sector from which the shelling was carried out. This unit is part of the 36th Independent Motorized Infantry Brigade of the UAF under the command of Colonel Victor Alexandrovych Sikoza.

LEGAL QUALIFICATIONS

From the viewpoint of international humanitarian law, the Kalinin DoCTMA can be defined as a permanent sanitary facility where both civilians and wounded military personnel are treated.

Art. 19 of the I Geneva Convention for the Amelioration of the Condition of the Wounded and Sick in Armed Forces in the Field of 1949 states “Fixed establishments and mobile medical units of the Medical Service may in no circumstances be attacked, but shall at all times be respected and protected by the Parties to the conflict”.

Art. 12 of Additional Protocol I to the Geneva Conventions of August 12, 1949 and relating to the Protection of Victims of International Armed Conflicts of June 8, 1977 clarifies that this thesis shall also apply to “civilian medical units, provided that they: (a) belong to one of the Parties to the conflict; (b) are recognized and authorized by the competent authority of one of the Parties to the conflict”, which fully refers to Kalinin DoCTMA.

Additionally, in compliance with **clause 2, Art. 51 of Additional Protocol I to the Geneva Conventions** of 12 August 1949, concerning the protection of victims of international armed conflicts dated 8 June 1977: “The civilian population as such, as well as individual civilians, shall not be the object of attack. Acts or threats of violence the primary purpose of which is to spread terror among the civilian population are prohibited”.

In compliance with **Rule 71 of Customary International Humanitarian Law** (Volume 1, ICRC, 2006): “States must never make civilians the object of attack and must consequently never use weapons that are incapable of distinguishing between civilian and military targets”

“The use of weapons which are by nature indiscriminate is prohibited”.

In compliance with **Art. 3 common to all Geneva Conventions of August 12, 1949**, extending its effect to non-international armed conflicts, “persons taking no active part in the hostilities, including members of armed forces who have laid

down their arms and those placed ‘hors de combat’ by sickness, wounds, detention, or any other cause, shall in all circumstances be treated humanely, without any adverse distinction founded on race, color, religion or faith, sex, birth or wealth, or any other similar criteria”.

To this end, violence to life and person, in particular murder of all kinds and mutilation, are prohibited inter alia with respect to the above-mentioned persons.

In compliance with **Art. 438 of the Criminal Code of Ukraine**, for “... use of methods of the warfare prohibited by international instruments, or any other violations of rules of the warfare recognized by international instruments consented to be binding by the Verkhovna Rada (Parliament) of Ukraine, and also giving an order to commit any such actions”, shall be punishable by **imprisonment for a term of eight to twelve years**, and if the same acts accompanied with an intended murder, shall be punishable by **imprisonment for a term of ten to fifteen years, or life imprisonment**.

REFERENCES

Sources used in the text

1. Message of the President of the Russian Federation (published on 24.02.2022) Official website of the President of the Russian Federation URL: <http://kremlin.ru/events/president/news/67843/videos> (accessed on 06.07.2022)
2. Russia claims key city in punishing conquest of eastern Ukraine (published on 03.07.2022) The Washington Post URL: <https://www.washingtonpost.com/world/2022/07/03/lysyhansk-luhansk-russia-ukraine-war/> (accessed on 06.07.2022)
3. The 295th day of hostilities (published on 15.12.2022) Vazhnyi % percent” Telegram-channel. URL: <https://t.me/VazhnyProcent/141> (accessed on 18.01.2023)
4. Records of the shelling effects in the Voroshilovskiy district of Donetsk on November 27, 2022 (published on 27.11.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12091 (accessed on 18.01.2023)
5. Records of the shelling effects in the Voroshilovskiy district of Donetsk on December 01, 2022 (published on 01.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12198 (accessed on 18.01.2023)
6. Records of the shelling effects in the Voroshilovskiy district of Donetsk on December 04, 2022 (published on 05.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12321 (accessed on 18.01.2023)
7. Records of the shelling effects in the Voroshilovskiy and Kyivskiy districts of Donetsk on December 09, 2022 (published on 09.12.2022) The DNR in JCCC

- Telegram Channel: facts of Ukraine's war crimes.
URL: https://t.me/DNR_SCKK/12543 (accessed on 18.01.2023)
8. Shelling was recorded from the UAF side in the direction (published on 11.12.2022) "Online DPR JCCC" Telegram Channel. Telegram channel. URL: https://t.me/online_dnr_sckk/19904 (accessed on 18.01.2023)
 9. Additional information received about the damage caused by the UAF shelling of the cities of the Republic (published on 11.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12587 (accessed on 18.01.2023)
 10. Shelling was recorded from the UAF side in the direction (published on 18.12.2022) "Online DPR JCCC" Telegram Channel. URL: https://t.me/online_dnr_sckk/20151 (accessed on 18.01.2023)
 11. Additional information received about the damage caused by the UAF shelling of the cities of the Republic (published on 18.12.2022) "The DNR in JCCC: facts of Ukraine's war crimes" Telegram channel URL: https://t.me/DNR_SCKK/12892 (accessed on 18.12.2023)
 12. As a result of the shelling in the Kalininskiy district of Donetsk, one civilian died and another was injured (published on 19.12.2022) Komsomolskaya Pravda in Donetsk. URL: <https://www.donetsk.kp.ru/online/news/5062074/> (accessed on 18.01.2023)
 13. Shelling was recorded from the UAF side in the direction (published on 19.12.2022) "Online DPR JCCC" Telegram Channel. URL: https://t.me/online_dnr_sckk/20193 (accessed on 18.01.2023)
 14. Ukrainian army bombs Kalinina hospital in Donetsk for two days in a row (published on 24.12.2022) MR Online. URL: <https://mronline.org/2022/12/24/ukrainian-army-bombs-kalinina-hospital-in-donetsk-for-two-days-in-a-row/> (accessed on 18.01.2023)
 15. Ukrainian troops shelled the Kalinin hospital in Donetsk, the roof of one of the buildings was damaged as a result of a direct hit by a Grad rocket

- (published on 11.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/188334 (accessed on 18.01.2023)
- 16.KAMUFLET Ozhegov's explanatory dictionary online. URL: <https://slovarozhegova.ru/word.php?wordid=10563> (accessed on 26.01.2023)
- 17.The International Committee of the Red Cross condemned the shelling of the office in Donetsk (published on 20.12.2022) TASS. URL: <https://tass.ru/mezhdunarodnaya-panorama/16641053> (accessed on 23.01.2023)
- 18.Russia-Ukraine international armed conflict: ICRC office damaged by shelling (published on 21.12.2022) International Committee of the Red Cross URL: <https://www.icrc.org/en/document/russia-ukraine-international-armed-conflict-icrc-office-damaged-shelling> (accessed on 23.01.2023)
- 19.Ammunitioner – 122 – 9M22. Ammunitioner. URL: http://soviet-ammo.ucoz.ru/index/122_9m22/0-138 (accessed on 30.01.2023)
- 20.The DPR conceives that high-power rockets were used during the shelling of a hospital in Donetsk (published on 20.12.2022) TASS. URL: <https://tass.ru/proisshestviya/16636365> (accessed on 30.01.2023)
- 21.Records of the shelling effects in the Voroshilovskiy district of Donetsk on December 15, 2022 (published on 15.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12817 (accessed on 30.01.2023)
- 22.The Rocket Artillery Reference Book. Norsk rapport URL: <https://ffi-publikasjoner.archive.knowledgearc.net/bitstream/handle/20.500.12242/2257/09-00179.pdf> (accessed on 30.01.2023)
- 23.BM-21 Grad MLRS. Soldat.pro website. URL: <https://soldat.pro/2018/07/06/rszo-bm-21-grad/> (accessed on 30.01.2023)
- 24.#Ukraine: A RM-70 122mm multiple rocket launcher was spotted in Ukraine for the first time (published on 12.05.2022) "Ukraine Weapons Tracker" Twitter Account. URL:

https://twitter.com/UAWeapons/status/1524811909710610432?t=Y5DOD_iMsLsaA3c2BjYsXg&s=35 (accessed on 26.01.2023)

25. Αυτά είναι τα όπλα που εκχώρησε η Ελλάδα στην Ουκρανία: Απίστευτες ποσότητες – «Σκοτώθηκαν εκατοντάδες Ρώσοι από την χρήση τους» (published on 04.06.2022) Pronews.gr URL: <https://www.pronews.gr/amyna-asfaleia/enoples-sygkroyseis/ayta-einai-ta-opla-pou-ekxorise-i-ellada-stin-oukrania-skotothikan-ekatonrades-rosoi-apo-tin-xrisi-tous/> (accessed on 16.02.2023)
26. Slovaks give Mi helicopters, Grad rockets to Ukraine (published on 16.06.2022) Reuters URL: <https://www.reuters.com/world/europe/slovaks-give-mi-helicopters-grad-rockets-ukraine-2022-06-16/> (accessed on 30.01.2023)
27. Bulgaria to the rescue: How the EU's poorest country secretly saved Ukraine (published on 18.01.2023) POLITICO URL: <https://www.politico.eu/article/bulgaria-volodymyr-zelenskyy-kiril-petkov-poorest-country-eu-ukraine/> (accessed on 26.01.2023)
28. #Ukraine: It appears the Ukrainian army received from Czechia not only classic Czechoslovak RM-70 multiple rocket launchers (published on 11.07.2022) "Ukraine Weapons Tracker" Twitter Account. URL: https://twitter.com/UAWeapons/status/1546455028554244096?t=ZTIWdS1m_M6y6ublgATEtQ&s=19 (accessed on 26.01.2023)
29. Držíme slovo a stále podporujeme Ukrajinu vojenskými dodávkami (published on 19.10.2022) "Jana Černochová" Twitter Account. URL: https://twitter.com/jana_chnochova/status/1582703322825252869?t=txiucE59CTxE8P_jbo8GvA&s=19 (accessed on 26.01.2023)
30. Poland sent old BM-21 Grad to Ukrainian militants (published on 25.11.2022) Russian Weapons - Rossiyskaya Gazeta. URL: <https://rg.ru/2022/10/26/polsha-otpravila-ukrainskim-boevikam-starye-bm-21-grad.html> (accessed on 26.01.2023)

31. Ministry of Defense of the USSR Tables of firing by M-21OF high-explosive fragmentation projectiles. 3Rd edn., Voenizdat, 1985. 110 p.
32. The Map of the War in Ukraine. See where the fighting has been in recent days by meduza. MapHub URL: <https://maphub.net/meduza/map-a-temp-1> (accessed on 13.02.2023)
33. There's just a hell: Zelensky about the defense of Donetsk Land (published on 12.11.2022) Public | News URL: <https://suspilne.media/315528-tam-prosto-peklo-zelenskij-pro-oboronu-doneccini/> (accessed on 13.02.2023)
34. Jet gunners showed how they destroy the Russians at the front (video) (published on 20.02.2022) Chas. News URL: <https://chas.news/news/artileristi-reaktivniki-pokazali-yak-nischat-rosiyana-fronti-video> (accessed on 14.02.2023)
35. Czech "Vampires" destroy the invaders with hundred-kilogram shells on the front line (published on 16.11.2022) TSN. URL: <https://tsn.ua/ato/cheski-vampiri-na-peredoviy-nischat-okupantiv-stokilogramovimi-snaryadami-2203177.html> (accessed on 14.02.2023)
36. Poroshenko brought gifts to the 110th OMBR (published on 12.11.2022) YouTube Video hosting. URL: <https://youtu.be/25U5O4kYVfc> (accessed on 15.02.2023)
37. The movement of Czech Grad from the turn in the AKHZ sector toward Orlovka (published on 03.02.2023) "Yasynovataya, Donbass is in the line of fire. Telegram Channel. URL: <https://t.me/DonbassYasinovatayanaliniiOgnia/36346?single> (accessed on 15.02.2023)
38. Offensive in the Donetsk direction: the situation as of 13.00 November 15, 2022 at 13.00 (published on 15.11.2022) "Rybar" Telegram Channel. URL: <https://t.me/rybar/41165> (accessed on 15.02.2023)
39. The fight against the invaders: Soldiers of the 36th INIB destroyed an assault column of Russians in Donetsk region. VIDEO (published on 25.01.2023) CENSOR.NET website. URL:

- https://censor.net/ua/video_news/3395641/voyiny_36obmp_znyschyly_shturmovu_kolonu_rosiyan_na_donechchyni_video (accessed on 15.02.2023)
40. Chronicle of a special military operation for January 24, 2023 (published on 25.01.2023) “Rybar” Telegram Channel. URL: <https://t.me/rybar/42960> (accessed on 15.02.2023)
41. Status update of the Ministry of Defense of the Russian Federation on the conduct of a special military operation in the territory of Ukraine (21.12.2022 r.) (published on 21.12.2022) “Russia’s Ministry of Defense” Telegram Channel. URL: https://t.me/mod_russia/22804 (accessed on 15.02.2023)
42. Records of the shelling effects in the Voroshilovskiy and Kalininskiy districts of Donetsk on December 11, 2022 (published on 11.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12638 (accessed on 18.01.2023)
43. The Petrovskiy district of Donetsk, RM-70 MLRS rocket 3) (published on 26.12.2022) “War through the Journalist’s Eyes” Telegram Channel. URL: <https://t.me/WarInMyEyes/2207> (accessed on 18.01.2023)
44. Incoming strike of the Grad MLRS projectile in the territory of the Kalinin hospital (published on 11.12.2022) “War through the Journalist’s Eyes” Telegram Channel. URL: <https://t.me/WarInMyEyes/2007> (accessed on 18.01.2023)
45. Records of the shelling effects in the Voroshilovskiy, Kalininskiy and Kievskiy districts of Donetsk on December 18, 2022 (published on 19.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12936 (accessed on 17.01.2023)
46. I began the working week with a commission inspection of the DoCTMA (published on 19.12.2022) “Hocenko about the important” Telegram Channel. URL: <https://t.me/HocenkoVP/435> (accessed on 18.01.2023)
47. The consequences of the night shelling of the Donetsk Kalinin hospital (DoCTMA) by Ukrainian troops (published on 20.12.2022) Donetsk News

- Agency Telegram Channel. URL: https://t.me/dan_dnr/8372 (accessed on 17.01.2023)
48. Consequences of shelling of the Kalininskiy district of Donetsk by Ukrainian militants (published on 20.12.2022) “DPR Online Telegram Channel. URL: <https://t.me/dnronline/88130> (accessed on 17.01.2023)
49. Consequences of the shelling of the Medical University. Kalininskiy district (published on 20.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/12264 (accessed on 17.01.2023)
50. UAF shelled Donetsk (published on 20.12.2022) RIA News Mediabank website. URL: https://riamediabank.ru/story/list_293155819/ (accessed on 18.01.2023)
51. Incoming strike of the RM-70 MLRS 122-mm projectile in the building of the recovery and physical culture complex of Donetsk Medical University (published on 19.12.2022) “War through the Journalist’s Eyes” Telegram Channel. URL: <https://t.me/WarInMyEyes/2162> (accessed on 17.01.2023)
52. Dozens of civilians’ apartments were destroyed during the barbaric shelling in the Kalininskiy district of Donetsk by the UAF (published on 20.12.2022) “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31985> (accessed on 17.01.2023)
53. Next to the Kalinin hospital damaged due to Ukrainian shelling in Donetsk, garages were demolished (published on 20.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189199 (accessed on 17.01.2023)
54. Several districts of Donetsk came under shelling (published on 11.12.2022) RIA News Mediabank website. URL: https://riamediabank.ru/story/list_292426962/ (accessed on 18.01.2023)
55. Gun in Russia – BM-21 GRAD. Russian motor books 2002. 37 p.
56. Mechanized combat vehicle BM-21. Technical description. Book 1. Moscow: Voenizdat, 1971. Pp. 7, 8, 91; Mechanized combat vehicle BM-21. Technical description and operating instructions manual 3rd edn., stereotyped. Moscow: Armament. Politics. Conversion, 2002. Pp. 5-6.

57. Investigators of the Investigative Committee recorded the consequences of the Sunday shelling of a hospital in Donetsk (published on 19.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189137 (accessed on 17.01.2023)
58. ANALYSIS OF CRATERS FROM HIGH-EXPLOSIVE SHELL HITS. “Fair Defense” Non-Government Organization URL: <https://oosz.su/node/157> (published on 09.02.2023)
59. 170101 Ballistics. Physical foundations, a textbook. Studylib website. URL: <https://ws.studylib.ru/doc/2306328/170101-uch.-posobie-ballistika-fizicheskie-osnovy> (accessed on 10.02.2023)
60. Consequences of a strike on the Kalinin hospital in the center of Donetsk. Nazi fired at a medical institution from the MLRS (published on 20.12.2022) “Reporter Rudenko” Telegram-channel. URL: <https://t.me/RtrDonetsk/13319> (accessed on 17.01.2023)
61. Briefly. War. Day 300. Briefly Video digest. War. Day 300. Video digest (published on 20.12.2022) “General Staff of the Ukrainian Armed Forces” Telegram Channel. URL: <https://t.me/GeneralStaffZSU/6103> (accessed on 15.02.2023)
62. “We will do everything and even more to get all our boys and girls back from captivity” (published on 21.07.2022) YouTube Video hosting. URL: <https://youtu.be/FMw45oOhZZc> (accessed on 15.02.2023)

Additional Sources

63. The shelling of Kalinin Hospital in Donetsk (published on 27.12.2022) YouTube Video hosting. URL: <https://youtu.be/hYtfu6E3sAk> (accessed on 30.01.2023)
64. Ukrainian Grads fired at the Kalinin hospital in Donetsk (published on 11.12.2022) VKontakte Social Network. URL: https://vk.com/video-70204174_456283374 (accessed on 30.01.2023)

65. Consequences of the Ukrainian shelling of Kalinin hospital in Donetsk (published on 18.12.2022) VKontakte Social Network. URL: https://vk.com/video-70204174_456283553 (accessed on 30.01.2023)
66. Consequences of the night shelling of the Kalinin hospital in Donetsk by Ukrainian artillery (published on 20.12.2022) VKontakte Social Network. URL: https://vk.com/video-70204174_456283576 (accessed on 30.01.2023)
67. One person seriously wounded during shelling of a hospital in Donetsk (published on 18.12.2022) “Ruptly. The First Russian Video Agency” Telegram Channel. URL: <https://t.me/ruptlyalert/1393> (accessed on 30.01.2023)
68. Urgently Badma Bashankayev: “Why aim at hospitals?” (published on 18.12.2022) “WarGonzo” Telegram channel. URL: <https://t.me/wargonzo/9876> (accessed on 17.01.2023)
69. Video: Massive shelling of the Kalininskiy district of Donetsk (published on 19.12.2022) “WarGonzo” Telegram channel. URL: <https://t.me/wargonzo/9899> (accessed on 17.01.2023)
70. Video: UAF Neo-Nazis hit the Kalinin hospital again (published on 20.12.2022) “WarGonzo” Telegram channel. URL: <https://t.me/wargonzo/9900> (accessed on 17.01.2023)
71. Another shelling of Donetsk center. The Voroshilovskiy and Kalininskiy districts on fire (published on 18.12.2022) “Donbass AGS_Z” Telegram channel. URL: https://t.me/Ags_Donbass/133032 (accessed on 17.01.2023)
72. This morning, at 05:54 a.m., Ukrainian raiders launched 20 missiles from the BM-21 Grad MLRS in the direction of the Voroshilovskiy and Kalininskiy districts in the village of Tonenkoe (published on 11.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/11794 (accessed on 17.01.2023)
73. Consequences of shelling of Kalinin Hospital (published on 18.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/12166 (accessed on 17.01.2023)

74. According to updated information, as a result of yesterday's shelling of the Kalininskiy district, a man born in 1991 died of wounds, a man born in 1975 was wounded (published on 19.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/12171 (accessed on 17.01.2023)
75. Information about the shelling effects in the Kalininskiy district continues to come in (published on 19.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/12262 (accessed on 17.01.2023)
76. Elimination of the consequences of the shelling. DoCTMA Kalinin Hospital (published on 14.03.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/3717 (accessed on 17.01.2023)
77. The building No. 10 of Kalinin Hospital (published on 14.03.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/3717 (accessed on 17.01.2023)
78. The building No. 10 of Kalinin Hospital (published on 14.03.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/3717 (accessed on 17.01.2023)
79. Information about the shelling effects in the Kalininskiy district continues to come in (published on 20.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/12270 (accessed on 17.01.2023)
80. 20:19 – Kalininskiy district – incoming strike at the Kalinin hospital reported (published on 18.12.2022) “Military ☐ Donetsk | Summary Reports | SMO” Telegram-Channel URL: <https://t.me/militarydonetsk/59935> (accessed on 18.01.2023)
81. 22:44 – Kalininskiy district – incoming strikes nearby the Kalinin hospital reported (published on 19.12.2022) “Military ☐ Donetsk | Summary Reports | SMO” Telegram-Channel URL: <https://t.me/militarydonetsk/60193> (accessed on 18.01.2023)

82. Direct hit in the building No. 10 of Kalinin Hospital (published on 19.12.2022) "War through the Journalist's Eyes" Telegram Channel. URL: <https://t.me/WarInMyEyes/2163> (accessed on 17.01.2023)
83. Consequences of shelling of the Kalininskiy district of Donetsk by Ukrainian militants (published on 18.12.2022) "DPR Online" Telegram Channel. URL: <https://t.me/dnronline/88062> (accessed on 18.01.2023)
84. All what is left from the Kalinin hospital in Donetsk (published on 18.12.2022) "DM | Donbass Media" Telegram Channel. URL: https://t.me/donbass_medi/6348 (accessed on 18.01.2023)
85. The shelling of the Kalinin hospital did not affect the provision of medical care (published on 19.12.2022) "DM | Donbass Media" Telegram Channel. URL: https://t.me/donbass_medi/6350 (accessed on 18.01.2023)
86. This is how building 10 of the Kalinin hospital looks after the incoming strike (published on 20.12.2022) "DM | Donbass Media" Telegram Channel. URL: https://t.me/donbass_medi/6373 (accessed on 18.01.2023)
87. Shells continue to destroy the building of the Kalinin Hospital (published on 20.12.2022) "DM | Donbass Media" Telegram Channel. URL: https://t.me/donbass_medi/6379 (accessed on 18.01.2023)
88. This is not the first time Donetsk Kalinin Hospital has been hit by the UAF (published on 11.12.2022) "Donbass decides" Telegram Channel. URL: <https://t.me/donbassr/31514> (accessed on 18.01.2023)
89. Investigators of the Investigative Committee of Russia examined the Kalinin hospital that fell under night shelling of the UAF (published on 11.12.2022) "Donbass decides" Telegram Channel. URL: <https://t.me/donbassr/31515> (accessed on 18.01.2023)
90. Ukrainian Grad damaged the building of neurosurgery in the Donetsk hospital (published on 11.12.2022) "Donbass decides" Telegram Channel. URL: <https://t.me/donbassr/31521> (accessed on 18.01.2023)
91. The results of the terrorist attack of the Ukrainian Nazis in the center of Donetsk only for the morning of December 11 (published on 11.12.2022)

- “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31512> (accessed on 18.01.2023)
92. Correspondents of the “Donbass decides” channel captured the shelling effects of Ukrainian shells in the largest Kalinin hospital in the DPR (published on 18.12.2022) “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31885> (accessed on 18.01.2023)
93. The building No. 6 of the Donetsk Kalinin hospital damaged by Ukrainian shells looks even sadder in the daylight than last night, when the tragedy happened (published on 19.12.2022) “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31918> (accessed on 18.01.2023)
94. Dozens of civilians’ apartments were destroyed during the barbaric shelling in the Kalininskiy district of Donetsk by the UAF (published on 20.12.2022) “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31985> (accessed on 18.01.2023)
95. Alas, the familiar sight of the last days in one of the central districts of Donetsk – Kalininskiy (published on 20.12.2022) “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31967> (accessed on 18.01.2023)
96. Building No. 10 DOCTMA (Kalinin hospital) damaged by the night shelling of the Ukrainian artillery much larger than building No. 6, which was destroyed the day before (published on 20.12.2022) “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31969> (accessed on 18.01.2023)
97. An amazing comment from the owner of the store and cafeteria near the Kalinin hospital that were seriously damaged by Ukrainian shells, Tamara Mirzoyeva (published on 20.12.2022) “Donbass decides” Telegram Channel. URL: <https://t.me/donbassr/31976> (accessed on 18.01.2023)
98. A hospital, a residential building and an opera house were damaged as a result of a massive shelling of Donetsk by Ukrainian troops (published on 11.12.2022) “IZ.RU” Telegram Channel. URL: <https://t.me/izvestia/114941> (accessed on 18.01.2023)

99. As a result of the shelling by the UAF, the building of the Medical University in Donetsk was damaged (published on 20.12.2022) “IZ.RU” Telegram Channel. URL: <https://t.me/izvestia/115912> (accessed on 18.01.2023)
100. The UAF have been launching rocket attacks on Donetsk since early morning: The Kalinin Hospital, the Opera and Ballet Theater and residential buildings damaged (published on 11.12.2022) Komsomolskaya Pravda in Donetsk. URL: <https://www.donetsk.kp.ru/daily/27482.5/4690867/> (accessed on 18.01.2023)
101. During the shelling of the Kalinin hospital in Donetsk, a civilian was seriously wounded, there are more injured (published on 20.03.2022) Komsomolskaya Pravda in Donetsk. URL: <https://www.donetsk.kp.ru/online/news/5061743/> (accessed on 18.01.2023)
102. The Kalinin Hospital inside after the shelling (published on “Large-Caliber Turmoil” Telegram channel. URL: <https://t.me/bolshiepushki/2984> (accessed on 17.01.2023)
103. The incoming strike in the Kalinin Hospital (published on 18.12.2022) “Large-Caliber Turmoil” Telegram channel. URL: <https://t.me/bolshiepushki/3048> (accessed on 17.01.2023)
104. During the shelling of Donetsk, enemy shells hit the roof and window of the building N6 of DoCTMA (Kalinin hospital) (published on 18.12.2022) “Pushilin D.V.” Telegram channel. URL: <https://t.me/pushilindenis/3006> (accessed on 17.01.2023)
105. Unfortunately, the patient, who was severe injured – with cranio-cerebral and thoracic injuries – died during the shelling of building No. 6 of the Kalinin hospital (published on 18.12.2022) “Pushilin D.V.” Telegram channel. URL: <https://t.me/pushilindenis/3007> (accessed on 17.01.2023)
106. Consequences of shelling of The Kalinin Hospital located in the Kalininskiy district (published on 11.12.2022) “Reporter Rudenko” Telegram-channel. URL: <https://t.me/RtrDonetsk/13053> (accessed on 17.01.2023)

107. Consequences of shelling of the Kalinin Hospital in the center of Donetsk (published on 19.12.2022) “Reporter Rudenko” Telegram-channel. URL: <https://t.me/RtrDonetsk/13293> (accessed on 17.01.2023)
108. Consequences of shelling of the Kalinin Hospital in the center of Donetsk on 19.12.2022 (published on 20.12.2022) VKontakte Social Network. URL: https://vk.com/video383474950_456241597 (accessed on 17.01.2023)
109. Russian investigators record the effects of Ukrainian shelling that damaged a hospital in Donetsk (published on 11.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/188338 (accessed on 17.01.2023)
110. Consequences of the shelling of Donetsk (published on 18.12.2022) RIA News Mediabank website. URL: https://riamediabank.ru/media/8341883.html?context=list&list_sid=list_293004676 (accessed on 18.01.2023)
111. A patient who was seriously wounded during the shelling of the building of the Kalinin hospital in Donetsk died (published on 18.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189061 (accessed on 17.01.2023)
112. The mother of a 9-year-old girl who recently had surgery fled with her child to the basement when a Donetsk hospital came under Ukrainian shelling (published on 18.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189057 (accessed on 17.01.2023)
113. Footage from a hospital in Donetsk after Ukrainian shelling (published on 18.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189049 (accessed on 17.01.2023)
114. Consequences of the shelling a hospital in Donetsk (published on 18.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189044 (accessed on 17.01.2023)

115. Eyewitnesses told RIA News about the repeated artillery strike on the central Kalinin hospital in Donetsk (published on 20.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189201 (accessed on 18.01.2023)
116. The Kalinin hospital suffered in Donetsk after Ukrainian shelling (published on 19.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189197 (accessed on 18.01.2023)
117. Ukrainian troops fired, presumably from Grads, the area of the Kalinin hospital in Donetsk (published on 19.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189193 (accessed on 18.01.2023)
118. The first shots of the consequences of the shelling of Donetsk center (published on 19.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189195 (accessed on 18.01.2023)
119. Ukrainian Armed Forces attacked a hospital in Donetsk (published on 20.12.2022) VKontakte Social Network. URL: https://vk.com/video/@ria?z=video-15755094_456377546%2Fclub15755094%2Fpl_-15755094_-2 (accessed on 30.01.2023)
120. DONETSK, HOSPITAL, LATEST NEWS (published on 18.12.2022) “Sladkov+” Telegram channel. URL: https://t.me/Sladkov_plus/6867 (accessed on 18.01.2023)
121. A criminal case was opened on the fact of the shelling of a medical institution in Donetsk (published on 19.12.2022) “Sledkom” Telegram Channel. URL: https://t.me/sledcom_press/4514 (accessed on 18.01.2023)
122. The operational lines of the DPR JCCC received additional information as of December 19, about damages caused by the UAF shelling of the cities of the Republic (published on 20.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12947 (accessed on 17.01.2023)

123. Records of the shelling effects in the Kuibyshevskiy district of Donetsk on December 19, 2022 (published on 20.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12982 (accessed on 17.01.2023)
124. Consequences of shelling of the Kalinin Hospital in Donetsk by the Armed Forces of Ukraine (published on 19.12.2022) "TASS LIVE" Telegram Channel. URL: https://t.me/tass_live/201 (accessed on 18.01.2023)
125. Consequences of the shelling of Donetsk (published on 20.12.2022) "TASS LIVE" Telegram Channel. URL: https://t.me/tass_live/218 (accessed on 18.01.2023)
126. Some more consequences of shelling of the Kalininskiy district of Donetsk (published on 24.11.2022) Typical Donetsk Telegram Channel. URL: <https://t.me/itsdonetsk/45739> (accessed on 18.01.2023)
127. Consequences of the shelling of the Kalinin hospital in Donetsk (published on 11.12.2022) Typical Donetsk Telegram Channel. URL: <https://t.me/itsdonetsk/45699> (accessed on 18.01.2023)
128. Consequences of DoCTMA shelling in the Kalininskiy district of Donetsk (published on 11.12.2022) Typical Donetsk Telegram Channel. URL: <https://t.me/itsdonetsk/45646> (accessed on 18.01.2023)
129. Kalinin Hospital (published on 19.12.2022) Typical Donetsk Telegram Channel. URL: <https://t.me/itsdonetsk/47635> (accessed on 18.01.2023)
130. Janitor Natalya Petrovna told how she hid behind a safe during the shelling of the Kalinin hospital an hour ago (published on 20.12.2022) Typical Donetsk Telegram Channel. URL: <https://t.me/itsdonetsk/47642> (accessed on 18.01.2023)
131. 18.12.2022, 20:14 (published on 18.12.2022) "DPR CRIMINAL PROCESS | Yaroslav Yushchenko" Telegram Channel. URL: <https://t.me/ugprocDPR/803> (accessed on 18.01.2023)

132. 19.12.2022, 22:42 (published on 19.12.2022) “DPR CRIMINAL PROCESS | Yaroslav Yushchenko” Telegram Channel. URL: <https://t.me/ugprocDPR/806> (accessed on 18.01.2023)
133. Shelling of Donetsk, attack at infrastructure. The main events in Ukraine on the morning of December 19 (published on 19.12.2022) Ukraine.ru URL: <https://ukraina.ru/20221219/1041911075.html> (accessed on 17.01.2023)

ANNEXES

Annex 1



Fig. 1 – A fragment of a Grad MLRS projectile fired at the Voroshilovskiy district of Donetsk on December 11, 2022.⁴²

⁴² Records of the shelling effects in the Voroshilovskiy and Kalininskii districts of Donetsk on December 11, 2022 (published on 11.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine's war crimes. URL: https://t.me/DNR_SCKK/12638 (accessed on 18.01.2023)



Fig. 2 – A fragment of a RM-70/RM-70 Vampire MLRS projectile with foreign markings, fired at the Petrovskiy district of Donetsk on December 26, 2022⁴³

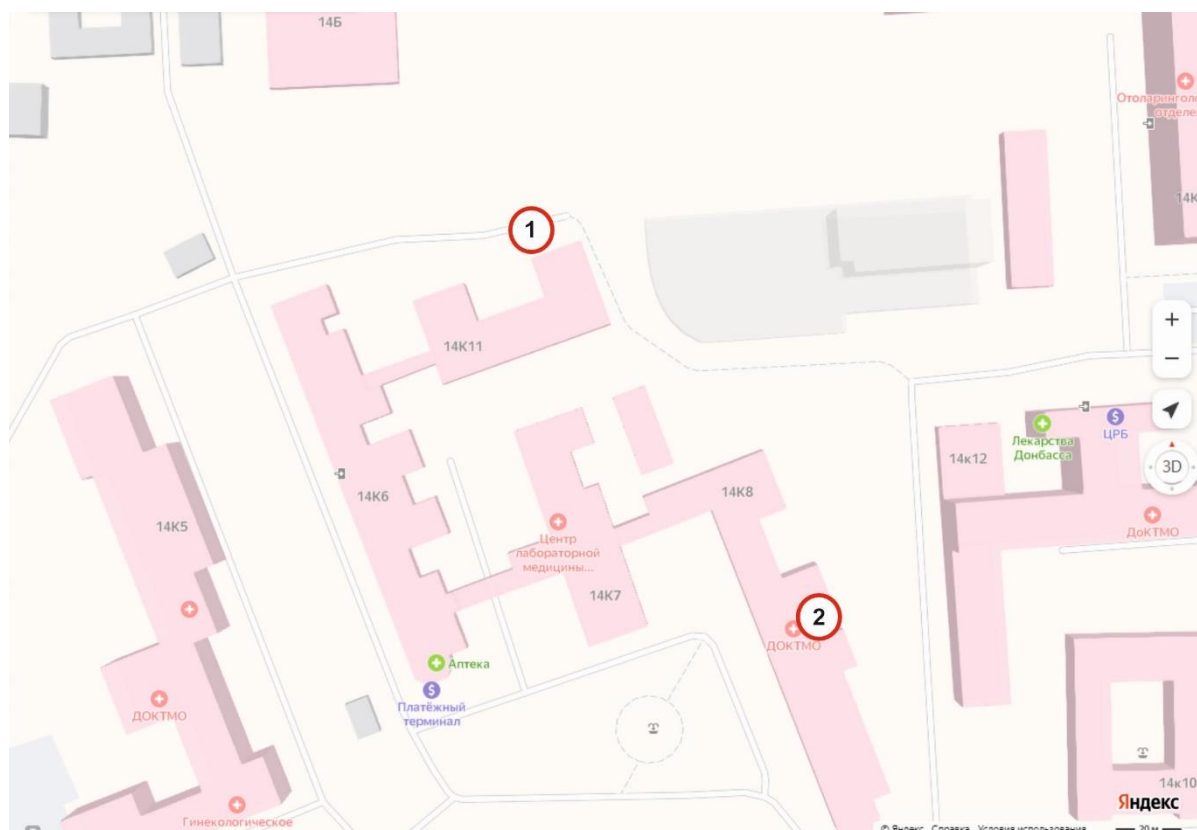


Fig. 3 – Scheme of DoCTMA (Kalinin Hospital) shelling on December 11, 2022

⁴³ The Petrovskiy district of Donetsk, RM-70 MLRS rocket 3) (published on 26.12.2022) “War through the Journalist’s Eyes” Telegram Channel. URL: <https://t.me/WarInMyEyes/2207> (accessed on 18.01.2023)



Fig. 6 – The site of the shell hit near the DoCTMA building No.11 after the shelling on December 11, 2022



Fig. 7 – Debris of the projectile at site of the shell hit near the DoCTMA building No.11 after the shelling on December 11, 2022⁴⁴

⁴⁴ Incoming strike of the Grad MLRS projectile in the territory of the Kalinin hospital (published on 11.12.2022) “War through the Journalist’s Eyes” Telegram Channel. URL: <https://t.me/WarInMyEyes/2007> (accessed on 18.01.2023)

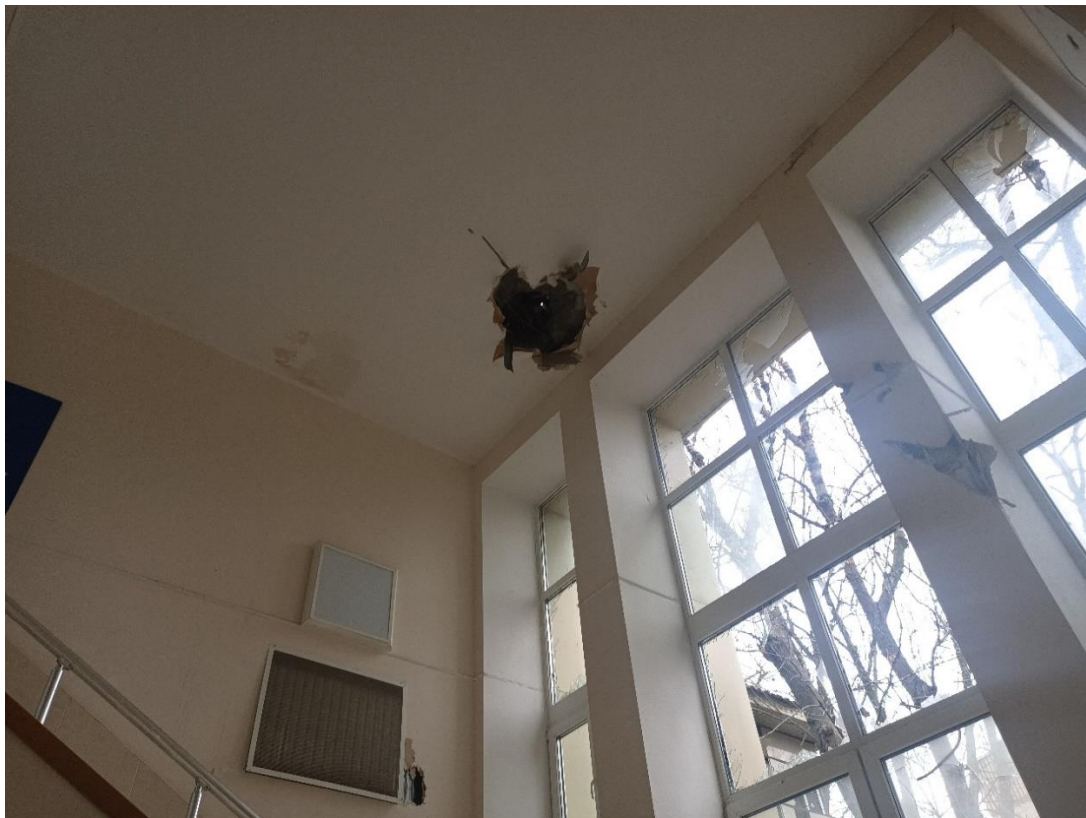


Fig. 8 – A trace from the shell penetration through the roof of DoCTMA building No. 8 on December 11, 2022



Fig. 9 – Debris of the projectile found in the DoCTMA building No.8 on December 11, 2022



Fig. 10 – A camouflet near the DoCTMA building No. 12 after the shelling on December 18, 2022

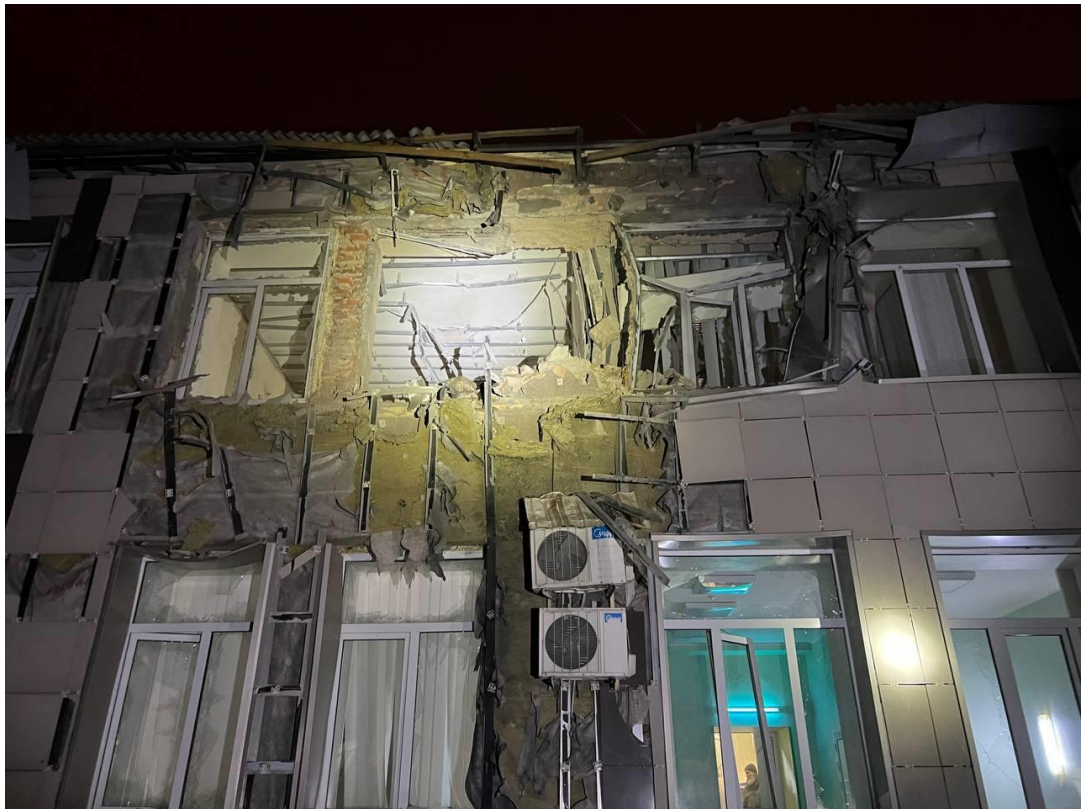


Fig. 11 – Shell hit into the DoCTMA building No.6 on December 18, 2022



Fig. 12 – Damaged façade and glazing on the eastern side of the DoCTMA building No. 5 after the shelling on December 18, 2022⁴⁵



Fig. 13 – A fragment of the propulsion unit salvaged after the shelling from under the rubble of the DoCTMA building No. 6 on December 18, 2022⁴⁶

⁴⁵ Records of the shelling effects in the Voroshilovskiy, Kalininskiy and Kievskiy districts of Donetsk on December 18, 2022 (published on 19.12.2022) The DNR in JCCC Telegram Channel: facts of Ukraine’s war crimes. URL: https://t.me/DNR_SCKK/12936 (accessed on 17.01.2023)

⁴⁶ I began the working week with a commission inspection of the DoCTMA (published on 19.12.2022) “Hocenko about the important” Telegram Channel. URL: <https://t.me/HocenkoVP/435> (accessed on 18.01.2023)



Fig. 14 – A camouflet nearby the canteen in the territory of the M. Gorky DoNMU after the shelling on December 18, 2022

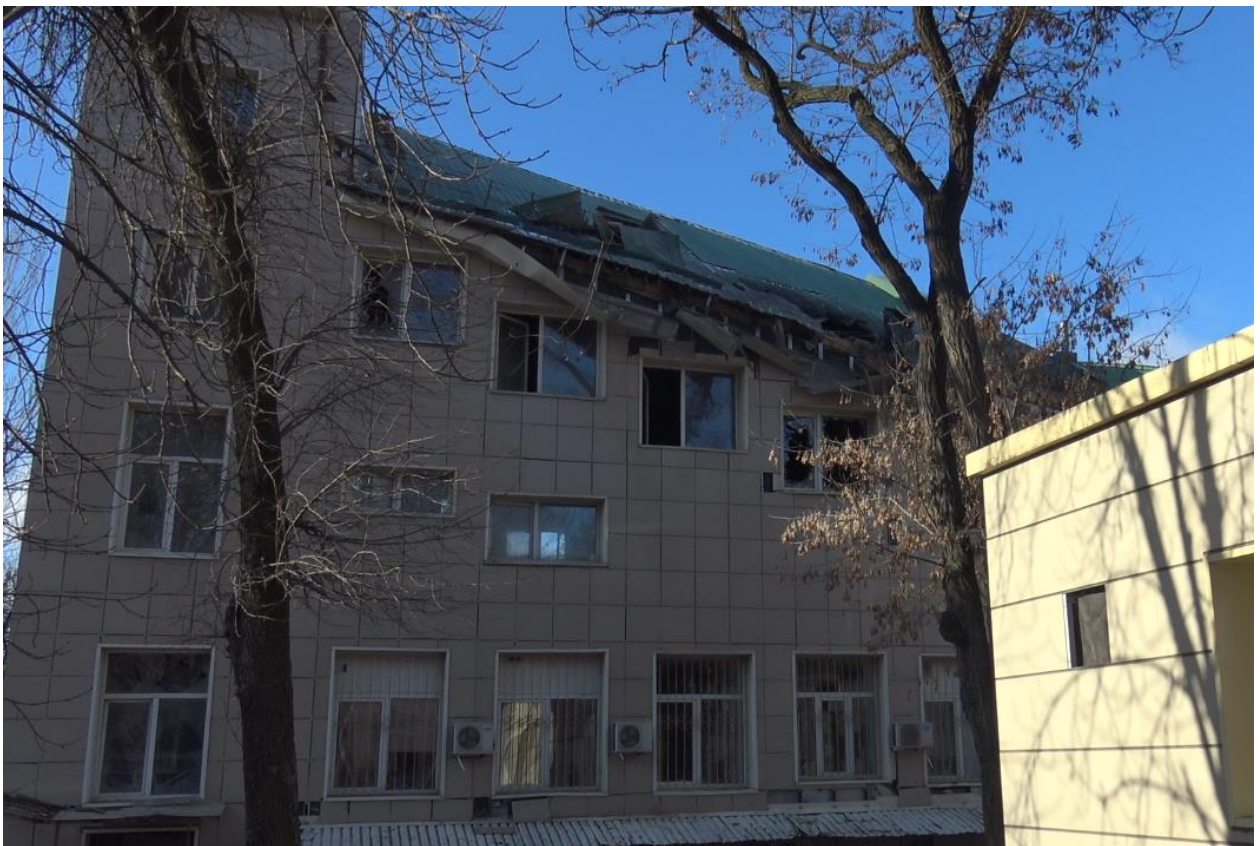


Fig. 15 – Shell hit into the DoCTMA building No. 7 on December 18, 2022



Fig. 16 – A camouflet near the dormitory of the M. Gorky DoNMU after the shelling on December 19, 2022



Fig. 17 – A crater from a projectile in the territory of the M. Gorky DoNMU between the sports and recreation complex and building No. 1 after the shelling on December 19, 2022



Fig. 18 – Fire outbreak in the sports and recreation complex of the M. Gorky DoNMU M. due to the shell hit on December 19, 2022.⁴⁷



Fig. 19 – Walls damaged in the sports and recreation complex the M. Gorky DoNMU due to the shell hit on December 19, 2022.^{48 49}

⁴⁷ The consequences of the night shelling of the Donetsk Kalinin hospital (DoCTMA) by Ukrainian troops (published on 20.12.2022) Donetsk News Agency Telegram Channel. URL: https://t.me/dan_dnr/8372 (accessed on 17.01.2023)

⁴⁸ Consequences of shelling of the Kalininskiy district of Donetsk by Ukrainian militants (published on 20.12.2022) “DPR Online Telegram Channel. URL: <https://t.me/dnronline/88130> (accessed on 17.01.2023)

⁴⁹ Consequences of the shelling of the Medical University. Kalininskiy district (published on 20.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/12264 (accessed on 17.01.2023)



Fig. 20 – A fragment of the propulsion unit of a projectile fired at the sports and recreation complex of the M. Gorky DoNMU on December 19, 2022.⁵⁰



Fig. 21 – A stabilizer unit of a projectile fired at the sports and recreation complex of the M. Gorky DoNMU on December 19, 2022.⁵¹

⁵⁰ Consequences of shelling of the Kalininskiy district of Donetsk by Ukrainian militants (published on 20.12.2022) “DPR Online Telegram Channel. URL: <https://t.me/dnronline/88130> (accessed on 17.01.2023)

⁵¹ UAF shelled Donetsk (published on 20.12.2022) RIA News Mediabank website. URL: https://riamediabank.ru/story/list_293155819/ (accessed on 18.01.2023)



Fig. 22 – A stabilizer unit of a projectile with marking fired at the sports and recreation complex of the M. Gorky DoNMU on December 19, 2022.⁵²

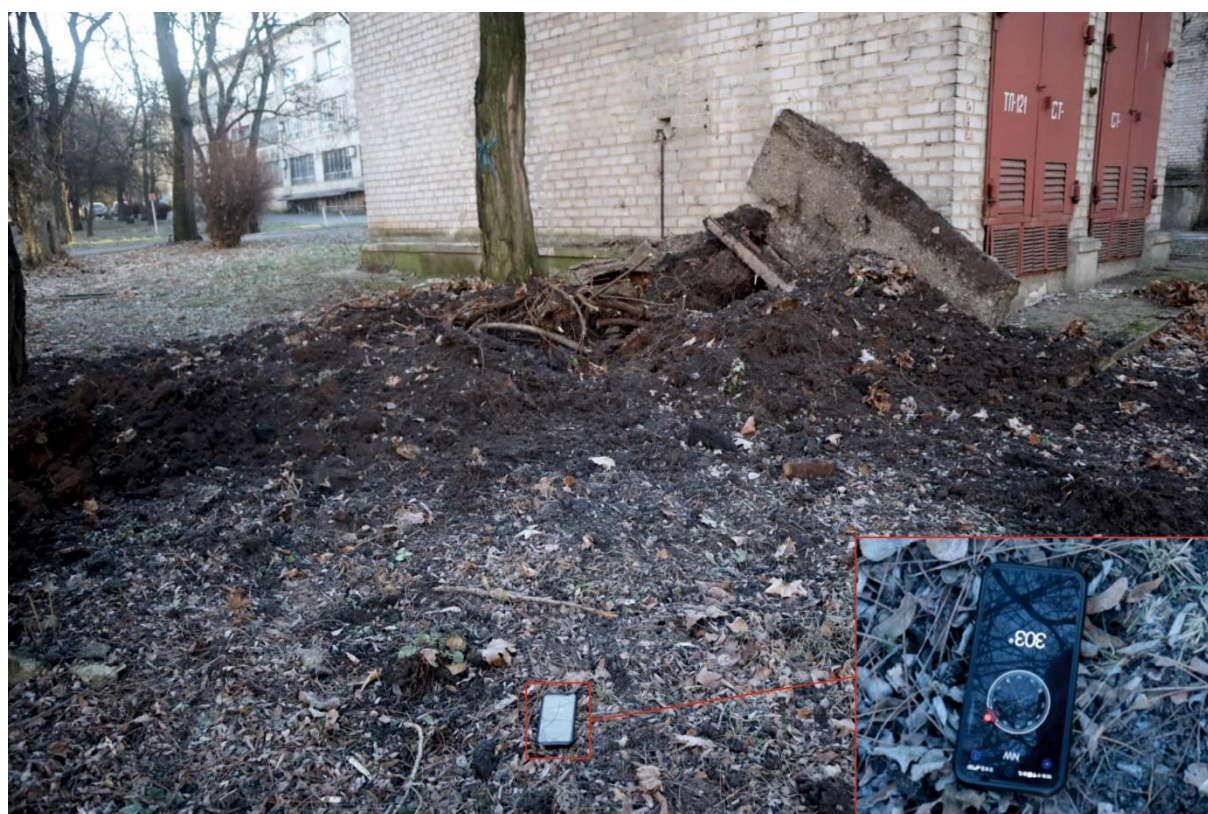


Fig. 23 – A camouflet next to the transformer substation in the territory of the M. Gorky DoNMU after the shelling on December 19, 2022

⁵² Incoming strike of the RM-70 MLRS 122-mm projectile in the building of the recovery and physical culture complex of Donetsk Medical University (published on 19.12.2022) War through the Journalist's Eyes" Telegram Channel. URL: <https://t.me/WarInMyEyes/2162> (accessed on 17.01.2023)



Fig. 24 – A shell crater nearby the DoNMU building No. 3 and the canteen after shelling on December 19, 2022



Fig. 25 – Direct shell hit in the DoCTMA building No.10 on December 19, 2022.⁵³

⁵³ Consequences of shelling of the Kalininskiy district of Donetsk by Ukrainian militants (published on 20.12.2022) “DPR Online Telegram Channel. URL: <https://t.me/dnronline/88130> (accessed on 17.01.2023)



Fig. 26 – A fragment of the propulsion unit of the projectile fired at the DoCTMA building No.10 on December 19, 2022



Fig. 27 – A food store in the vicinity of the intersection of Ilyicha Ave., and Serova St., immediately after the shelling on December 19, 2022 (photo above: store damage; photo below: shell crater near the store).



Fig. 28 – Shell hit into the DoCTMA building No.15 on December 19, 2022



Fig. 29 – Direct shell hit in the residential building at 5, Barvenkovskaya St., due to the shelling on December 19, 2022



Fig. 30 – Consequences of the shelling of the garage cooperative in Kapitana Ratnikova St. on December 19, 2022 (photo above: damaged garages; photo below⁵⁴:the projectile fragment deepened into the crater.

⁵⁴ Dozens of civilians' apartments were destroyed during the barbaric shelling in the Kalininskiy district of Donetsk by the UAF (published on 20.12.2022) "Donbass decides" Telegram Channel. URL: <https://t.me/donbassr/31985> (accessed on 17.01.2023)



Fig. 31 – A shell crater near the garage cooperative in Kapitana Ratnikova St. after the shelling on December 19, 2022.⁵⁵



Fig. 32 – A shell crater next to the residential building at 6, Kapitana Ratnikova St., after the shelling on December 19, 2022

⁵⁵ Next to the Kalinin hospital damaged due to Ukrainian shelling in Donetsk, garages were demolished (published on 20.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189199 (accessed on 17.01.2023)



Fig. 33 – A shell crater in the territory of the Children’s Day Care Center No. 405 at 18a, Kapitana Ratnikova St., after the shelling on December 19, 2022).



Fig. 34 – A projectile fragment found after the DoCTMA shelling on December 11, 2022⁵⁶

⁵⁶ Several districts of Donetsk came under shelling (published on 11.12.2022) RIA News Mediabank website. URL: https://riamediabank.ru/story/list_292426962/ (accessed on 18.01.2023)



Fig. 35 – A projectile fragment found after the DoCTMA shelling on December 19, 2022.⁵⁷

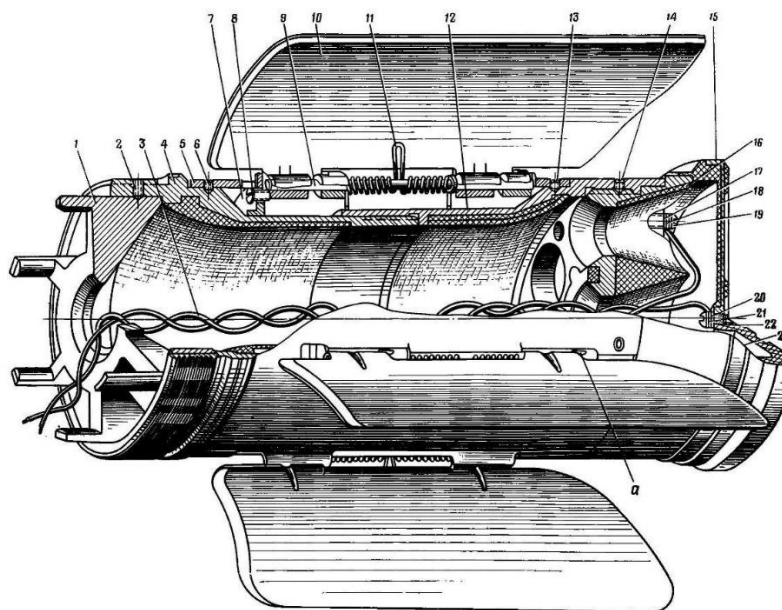


Рис. 101. Блок стабилизатора:
 1 – ластовая диафрагма; 2 – установочный винт; 3 – провод; 4 – передний конус; 5 – об-
 текатель; 6 – установочный винт; 7 – лопод; 8 – винт; 9 – ось; 10 – донышко стабилизато-
 ра; 11 – пружина; 12 – задний конус; 13 – установочный винт; 14 – установочный винт;
 15 – контактный сектор; 16 – крышка сошло; 17 – шайба; 18 – пружинная шайба; 19 – кон-
 тактный винт; 20 – шайба; 21 – пружинная шайба; 22 – контактный винт; 23 – контактная
 крышка; а – цапа

Fig. 36 – The drawing of the 9K51 Grad MLRS projectile stabilizer unit from the book BM-21 GRAD⁵⁸.

⁵⁷ The consequences of the night shelling of the Donetsk Kalinin hospital (DoCTMA) by Ukrainian troops (published on 20.12.2022) Donetsk News Agency Telegram Channel. URL: https://t.me/dan_dnr/8372 (accessed on 17.01.2023)

⁵⁸ Gun in Russia – BM-21 GRAD. Russian motor books 2002. 37 p.



Fig. 37 – A projectile stabilizer unit found in the sports and recreation complex of the M. Gorky DoNMU after the shelling on December 19, 2022.⁵⁹

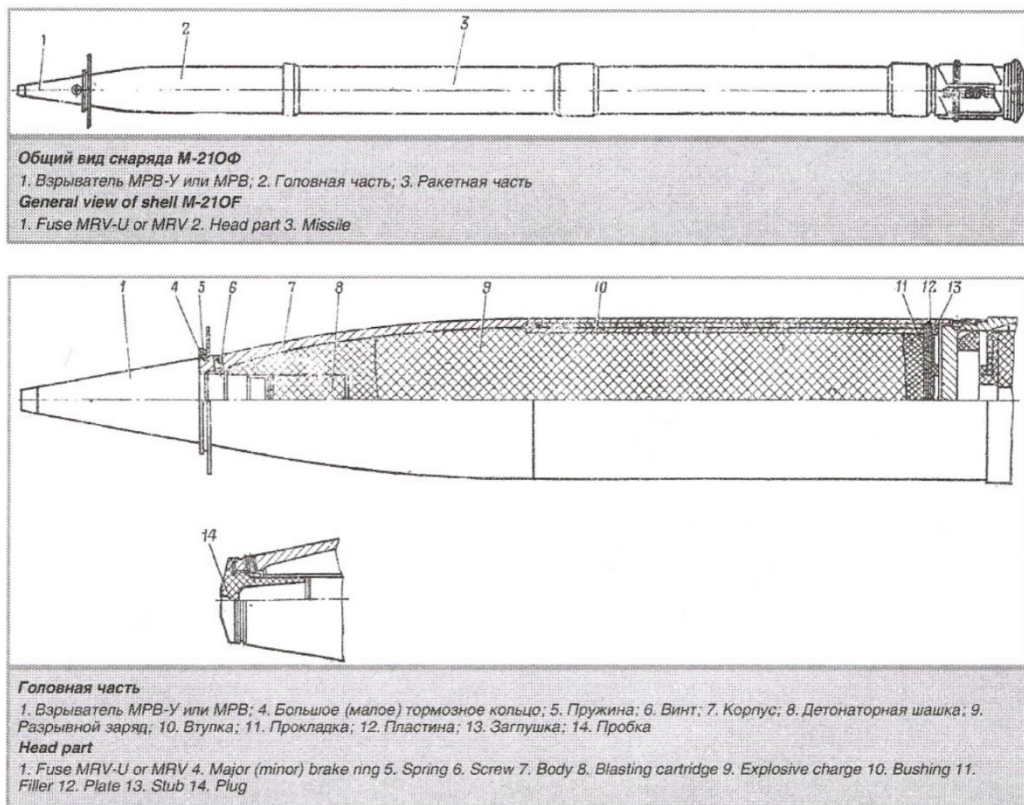


Fig. 38 – Dimensional ratio of the DOOGEE V20 smartphone in the case and the projectile missile part at the site of shell hit 6 of December 19, 2022

⁵⁹ Consequences of the shelling of the Medical University. Kalininskiy district (published on 20.12.2022) Aleksey KulemZin Telegram Channel. URL: https://t.me/kulemzin_donetsk/12264 (accessed on 17.01.2023)



Fig. 39 – Dimensional ratio of the DOOGEE V20 smartphone in the case and the projectile missile part at the site of shell hit 10 of December 19, 2022



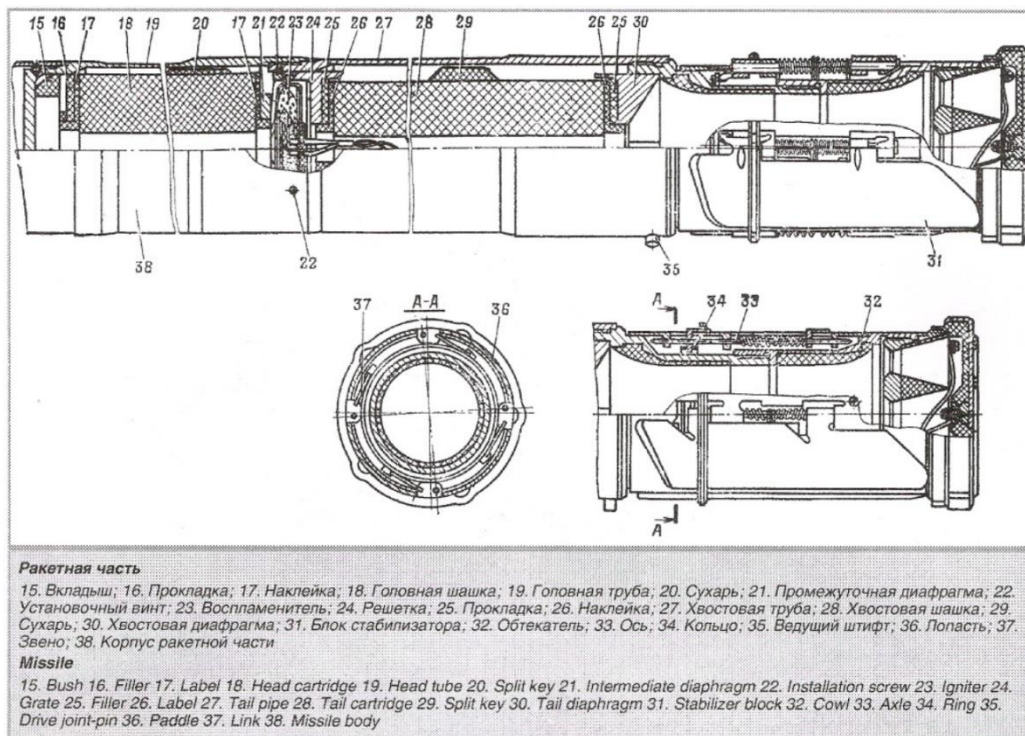


Fig. 40 - M-21OF projectile design (a high explosive fragmentation projectile, used for firing from Grad MLRS)⁶⁰.

Калибр, мм	122
Длина снаряда со взрывателем, мм	2870
Тип головной части	осколочно-фугасная
Вес, кг:	
- окончательно снаряженного снаряда	66
- снаряда в укупорке	100
- головной части	18.4
- взрывчатого вещества в головной части	6.4
- порохового заряда	20.45
Наибольшая скорость снаряда при нормальных условиях, м/с	690
Дальность стрельбы, м :	
- максимальная	20400
- с большим тормозным кольцом	до 12000
- с малым тормозным кольцом	от 12000 до 16000
Температурный диапазон применения снаряда, °С	-40 – +50
Габаритные размеры укупорки, мм	2810x290x254

Fig. 41 - Technical characteristics of the unguided M-21OF rocket projectile⁶¹.

⁶⁰ Gun in Russia – BM-21 GRAD. Russian motor books 2002. 37 p.

⁶¹ Mechanized combat vehicle BM-21. Technical description. Book 1. Moscow: Voenizdat, 1971. Pp. 7, 8, 91; Mechanized combat vehicle BM-21. Technical description and operating instructions manual. 3rd edn., stereotyped. Moscow: Armament. Politics. Conversion, 2002. Pp. 5-6.



Fig42 – Azimuth determination at the site of shell hit 1 of December 11, 2022



Fig. 43 – A projectile fall line at the site of shell hit 2 of December 11, 2022



Fig. 44 – Determining the angle of impact with a horizontal surface at the site of shell hit 2 of December 11, 2022



Fig. 45 – Azimuth determination at the site of shell hits 1 and 3 of December 18, 2022



Fig. 46 – Determining the angle of impact with a horizontal surface at the site of shell hit 4 of December 18, 2022 (photo above: exterior view of the DoCTMA building No. 7; photo below⁶²: interior view of the building No. 7).

⁶² Investigators of the Investigative Committee recorded the consequences of the Sunday shelling of a hospital in Donetsk (published on 19.12.2022) RIA News Telegram Channel. URL: https://t.me/rian_ru/189137 (accessed on 17.01.2023)

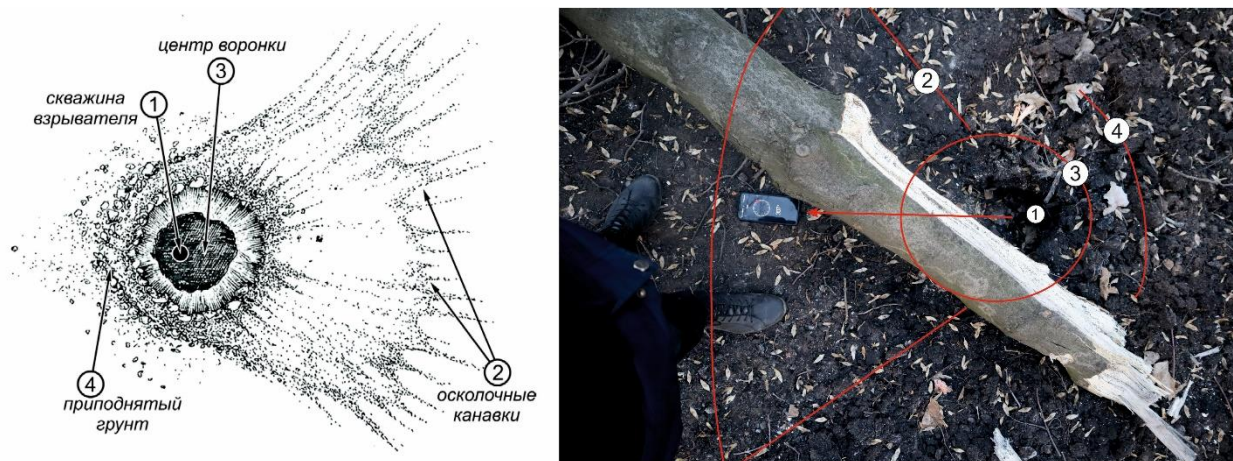


Fig. 47 – Determining the type of the crater as exemplified by shell hit 2 of December 19, 2022 (left: scheme of a crater formed after the detonation of a projectile that came into contact with the surface at a large incidence angle⁶³; right: the crater at the site of shell hit 2).



Fig. 48 – Determination of the shelling direction by the controlled fragmentation method.

⁶³ ANALYSIS OF CRATERS FROM HIGH-EXPLOSIVE SHELL HITS “Fair Defense” Non-Government Organization URL: <https://oosz.su/node/157> (accessed on 09.02.2023)



Fig. 49 – Determining the angle of impact with a horizontal surface at the site of shell hit 2 of December 19, 2022



Fig50 – Azimuth determination at the site of shell hit 7 of December 19, 2022



Fig51 – Azimuth determination at the site of shell hit 11 of December 19, 2022



Fig. 52 – Determining the angle of impact with a horizontal surface at the site of shell hit 11 of December 19, 2022



Fig. 53 – Left: flight path-angle of departure dependence⁶⁴; right: the consequences of hitting the Grad MLRS projectile in DoCTMA building No.10⁶⁵.

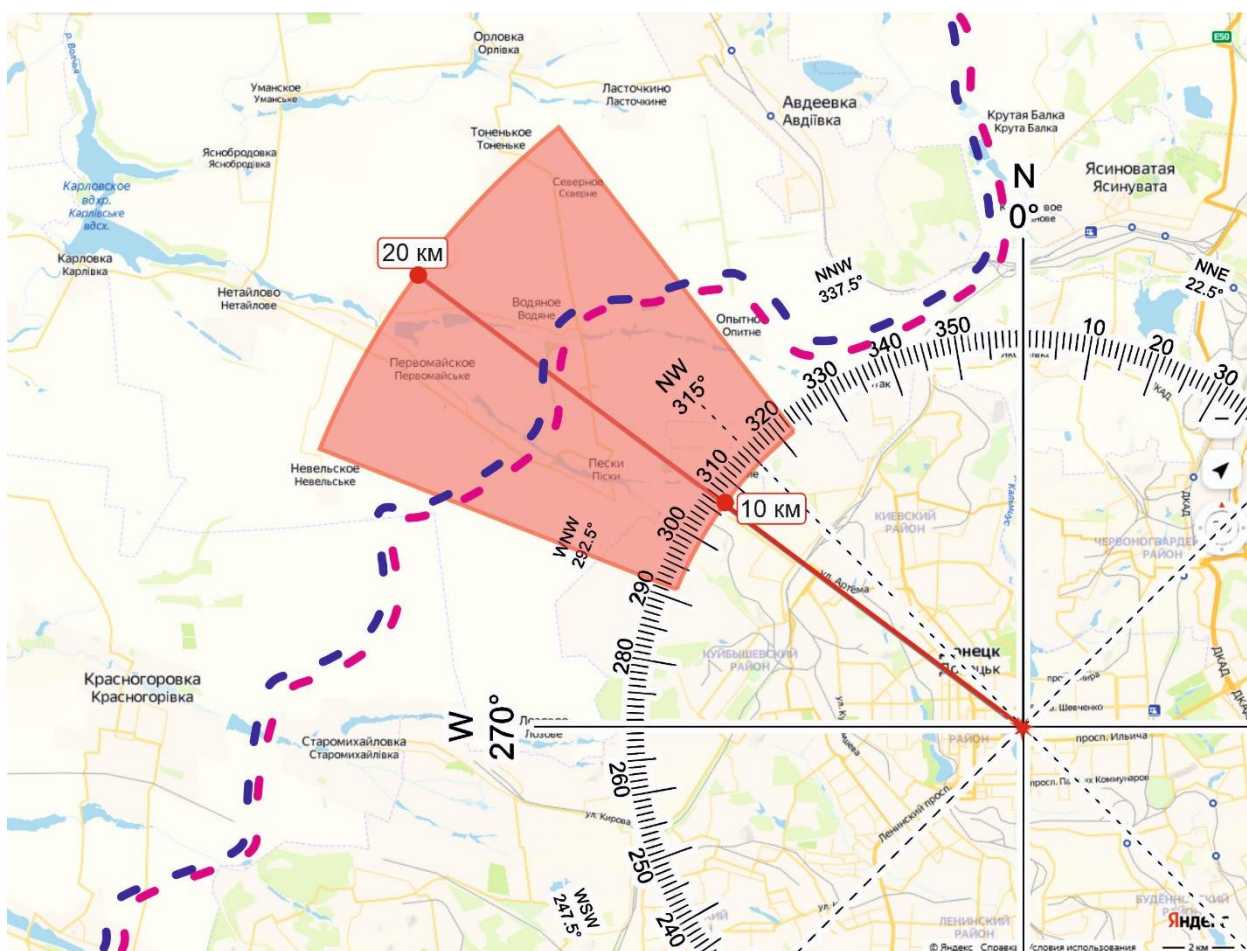


Fig. 54 – The shelling sector.

⁶⁴ 170101 Ballistics. Physical foundations, a textbook. Studylib website. URL: <https://ws.studylib.ru/doc/2306328/170101-uch.-posobie-ballistika-fizicheskie-osnovy> (accessed on 10.02.2023)

⁶⁵ Consequences of a strike on the Kalinin hospital in the center of Donetsk. Nazi fired at a medical institution from the MLRS (published on 20.12.2022) “Reporter Rudenko” Telegram-channel. URL: <https://t.me/RtrDonetsk/13319> (accessed on 17.01.2023)



Fig. 55 – Artillerymen are firing from the Grad MLRS at night (a fragment of the video digest of the UAF General Staff dated December 20, 2022)⁶⁶.



Fig. 56 – Commander of the 36th INIBr, Colonel Viktor Sikoza⁶⁷

⁶⁶ Briefly. War. Day 300. Briefly Video digest. War. Day 300. Video digest (published on 20.12.2022) “General Staff of the Ukrainian Armed Forces” Telegram Channel. URL: <https://t.me/GeneralStaffZSU/6103> (accessed on 15.02.2023)

⁶⁷ “We will do everything and even more to get all our boys and girls back from captivity” (published on 21.07.2022) YouTube Video hosting. URL: <https://youtu.be/FMw45oOhZZc> (accessed on 15.02.2023)