

Briefing Paper

## Landmine Use in Ukraine

June 2023



Ukrainian military personnel search for land mines at a burial site in a forest on the outskirts of Izium, eastern Ukraine, September 16, 2022. © 2022 Juan BARRETO / AFP

This background briefing surveys the types of landmines used in Ukraine since the full-scale Russian invasion began on February 24, 2022.<sup>1</sup> Antipersonnel mines explode by the presence, proximity, or contact of a person, and can kill and injure people long after armed conflicts end. The 1997 Mine Ban Treaty prohibits antipersonnel mines, but not antivehicle mines or command-

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<sup>1</sup> For more information on antipersonnel landmines, see, for example, Human Rights Watch, “Antipersonnel Landmines,” YouTube, January 25, 2023, [https://youtu.be/byhx2XTA\\_rY](https://youtu.be/byhx2XTA_rY) (accessed June 7, 2023).

detonated (remote-controlled) mines, which are also surveyed in this briefing.<sup>2</sup> Other international agreements weakly restrict anti-vehicle mine use, and international efforts to strengthen existing protections have stalled.<sup>3</sup>

Visuals and accounts from deminers working in Ukraine indicate that the use of antipersonnel and anti-vehicle mines in the armed conflict is resulting in a large, dispersed, and complex level of contamination that will threaten Ukrainian civilians and hinder recovery efforts for years to come.

## Findings

Ukraine is severely contaminated with landmines and explosive remnants of war (ERW) from the armed conflict that began in 2014 and surged with Russia's full-scale invasion in February 2022.<sup>4</sup>

Landmines have been documented in 11 of Ukraine's 27 regions: Chernihivska, Dnipropetrovska, Donetsk, Kharkivska, Khersonska, Kyivska, Luhanska, Mykolaivska, Odeska, Sumska, and Zaporizka.

### Antipersonnel Mines

- Russian forces are known to have used at least 13 types of antipersonnel mines since February 2022.
- Human Rights Watch documented Ukrainian forces repeatedly used rocket-delivered PFM antipersonnel blast mines in attacks on and around the city of Izium during the summer months of 2022 when Russian forces controlled the city and its environs.
  - Ukrainian Deputy Defense Minister Oleksandr Polishchuk responded by letter to Human Rights Watch's questions about Ukrainian forces' use of PFM antipersonnel mines, saying that Ukrainian authorities cannot comment on the types of weapons

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<sup>2</sup> Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, adopted September 18, 1997, <https://ihl-databases.icrc.org/en/ihl-treaties/apmbc> (accessed June 7, 2023).

<sup>3</sup> See, for example, United Nations Convention on Certain Conventional Weapons, Amended Protocol II, "Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices," as amended on May 3, 1996, <https://geneva-s3.unoda.org/static-unoda-site/pages/templates/the-convention-on-certain-conventional-weapons/PROTOCOL%2BII.pdf> (accessed June 9, 2022); UN Group of Governmental Experts of the States Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons, "Proposals and ideas on MOTAPM in the Group of Governmental Experts (GGE) with the purpose to provide a basis for further work/ prepared by the Coordinator," March 1, 2005, <https://digitallibrary.un.org/record/553025?ln=en> (accessed June 7, 2023).

<sup>4</sup> Explosive Remnants of War (ERW) are defined as unexploded ordnance and abandoned explosive ordnance by Protocol V of the Convention on Conventional Weapons (CCW). Ukraine is also affected by contamination by mines and ERW remaining from World War I and World War II.

used during the armed conflict “before the end of the war and the restoration of our sovereignty and territorial integrity.”<sup>5</sup>

- On January 31, 2023, the Ministry of Foreign Affairs stated that Human Rights Watch’s findings “will be duly studied by the competent authorities of Ukraine.”<sup>6</sup>
- The use of antipersonnel mines by Ukraine is a violation of the 1997 Mine Ban Treaty, to which Ukraine is party.
- Russian forces also emplaced numerous victim-activated booby-traps as they retreated from positions they had taken, occupied, or fortified during the 2022 invasion. Booby-traps can function as antipersonnel mines when a person unintentionally activates the fuze and detonates the device.

### Anti-Vehicle Mines

- Both Russian and Ukrainian forces have used at least 13 types of anti-vehicle mines (also called anti-tank mines).
- Hand-emplaced TM-62 series anti-vehicle mines appear to be the type most frequently deployed.
- States supplying Ukraine with weapons have transferred seven types of anti-vehicle mines. Those states include Estonia, France, Germany, Sweden, UK, and the US.

### General Observations

- Several landmine delivery methods have been documented since February 2022: hand-emplaced, mechanically laid, scattered by truck-mounted projectors, and remotely delivered by rockets.
- Both Russia and Ukraine stockpile landmines inherited from the former Soviet Union.
- Russia continues to produce both antipersonnel and anti-vehicle mines; several new, previously unseen Russian landmines have been identified in use for the first time, including some antipersonnel mines produced as late as 2021.

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<sup>5</sup> Letter from Minister Oleksandr Polishchuk, Ukrainian Deputy Defense, responding to Human Rights Watch, November 24, 2023 in Human Rights Watch, *Ukraine: Banned Landmines Harm Civilians*, January 31, 2023, <https://www.hrw.org/news/2023/01/31/ukraine-banned-landmines-harm-civilians>.

<sup>6</sup> “Comment of the Ministry of Foreign Affairs regarding Report of the Human Rights Watch,” Ministry of Foreign Affairs of Ukraine, January 31, 2023, <https://mfa.gov.ua/en/news/komentar-mzs-ukrayini-shchodo-zvitu-organizaciyi-human-rights-watch> (accessed June 7, 2023).

- Landmine casualties have been reported in the conflict in Ukraine, including by Human Rights Watch, and new mine use can also be seen in the denial of access to homes, infrastructure, transportation routes, and agricultural lands used by civilians.<sup>7</sup>
- Landmines in fields and on rural paths and roads are harming agricultural production.

## Recommendations

All parties to the armed conflict in Ukraine should ensure that no antipersonnel mines are used by any actor and destroy any antipersonnel mines that they have seized or otherwise acquired. In addition:

1. Ukraine should ensure that its forces respect their obligations under the Mine Ban Treaty in all circumstances. The Ukrainian government should confirm to states parties that remaining stockpiles of PFM antipersonnel mines currently in storage awaiting destruction cannot be used in combat operations.
2. Russia should fully abide by the prohibitions and restrictions of the Convention on Conventional Weapons Amended Protocol II, including the detectability and reliability of any mines it uses in this conflict, as well as marking, monitoring, and ensuring the effective exclusion of civilians from mined areas.<sup>8</sup>
3. All parties to the Mine Ban Treaty supporting Russia’s war effort, such as Belarus, and several states parties that are supplying Ukraine with weapons, need to ensure that these activities do not violate the prohibition on assisting, encouraging or inducing a non-party to engage in activities prohibited by the treaty.<sup>9</sup> This means avoiding participating in the planning for use of antipersonnel mines; not committing to rules of engagement that permit use of antipersonnel mines; not accepting orders to use, request others to use, or

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<sup>7</sup> See, for example, Human Rights Watch, “Ukraine: Russian Landmine Use Endangers Civilians,” June 15, 2022, <https://www.hrw.org/news/2022/06/15/ukraine-russian-landmine-use-endangers-civilians>; Human Rights Watch, “Ukraine: Russia Uses Banned Antipersonnel Landmines,” March 29, 2022, <https://www.hrw.org/news/2022/03/29/ukraine-russia-uses-banned-antipersonnel-landmines>; Human Rights Watch, “Landmines: Boost Support for Global Ban Treaty,” November 17, 2022, <https://www.hrw.org/news/2022/11/17/landmines-boost-support-global-ban-treaty>; Human Rights Watch, *Ukraine: Banned Landmines Harm Civilians*, January 31, 2023, <https://www.hrw.org/news/2023/01/31/ukraine-banned-landmines-harm-civilians>.

<sup>8</sup> United Nations Convention on Certain Conventional Weapons, Amended Protocol II, “Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices,” as amended on May 3, 1996, <https://geneva-s3.unoda.org/static-unoda-site/pages/templates/the-convention-on-certain-conventional-weapons/PROTOCOL%2BII.pdf> (accessed June 7, 2023).

<sup>9</sup> Landmine and Cluster Munition Monitor Factsheet, Mine Ban Treaty Special Issues of Concerns (Articles 1, 2, 3), June 2014, [http://www.the-monitor.org/media/1464902/BanFactSheet\\_SpecialIssues\\_Final.pdf](http://www.the-monitor.org/media/1464902/BanFactSheet_SpecialIssues_Final.pdf) (accessed June 7, 2023).

train others to use antipersonnel mines, not knowingly deriving military benefit from the use of the weapon by others; and not providing security, storage, transportation or transit for antipersonnel mines.

4. Ukraine should continue efforts to identify victims, collect comprehensive data about victims and their needs, inform them of their rights and availability of services, and provide appropriate and timely compensation, assistance, and support to those injured and the families of those killed by mines, including medical care, psychosocial support, prosthetics where appropriate and ongoing rehabilitation needs, as well as to other landmine victims in Ukraine. Donor countries should support the Ukrainian government's efforts to identify victims, provide medical and other assistance, destroy stockpiled mines, and clear mine-contaminated areas.
5. In territory occupied by its forces and in line with its obligations under the Geneva Conventions, Russia should provide explosive ordnance risk education for the population, compensation to those injured and the families of those killed by mines, medical care for mine victims including prosthetics where appropriate and other rehabilitation needs.

## Methodology

This background briefing draws on information collected by Human Rights Watch in Ukraine, including from witnesses to landmine use, victims of landmines and their families, first responders, doctors, and Ukrainian deminers. It also relies on several other sources, including:

- Verified videos and photos, obtained directly or via social media, showing landmines or evidence of their use.
- Information shared with Human Rights Watch by international and national demining personnel, armament research specialists, domestic and international media, military analysts, and human rights organizations;
- Displays of landmines cleared by government authorities and deminers;
- Munitions technical reference guides maintained by the Geneva International Centre for Humanitarian Demining (GICHD), Collective Awareness to UXO (CAT-UXO.com), Fenix Insight, Jane's Information Group, Armament Research Services (ARES), and Russia Military

Parade. Of particular utility for ordnance identification is the GICHD’s “Explosive Ordnance Guide for Ukraine,” second-edition guide.<sup>10</sup>

- *Landmine Monitor Report* profiles of Russia and Ukraine.<sup>11</sup>

This document updates a June 2022 briefing paper by Human Rights Watch.<sup>12</sup> It should be regarded as an interim overview because active combat operations limit access by independent observers to battlefield areas. It is not currently possible to survey mine contamination systematically or determine the full number of casualties caused by landmine use given ongoing hostilities.

Some of the data presented here is taken from government sources or was posted to social media by third parties and should be treated with care, particularly in attributing responsibility for +landmines use and its compliance with treaty obligations and international humanitarian law.

Other types of mines reported in the Ukraine conflict by various sources and media outlets have not been included in this interim accounting for various reasons. Some have dubious sourcing, visual materials that appear to be staged, or they appear to show mines from displays and inert models of mines and ERW used for recognition or risk education training. This background briefing also does not address sea mines or anti-landing mines such as the PDM-1M.

Human Rights Watch welcomes corrections and further information.

## **Types of Landmines Used in Ukraine since 2022**

Human Rights Watch has identified at least 13 types of antipersonnel mines and 13 types of anti-vehicle mines used in the current conflict in Ukraine through June 2023 (see tables below). The 2022 background briefing identified at least seven types of antipersonnel mines and six types of anti-vehicle mines.

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<sup>10</sup> Geneva International Centre for Humanitarian Demining (GICHD), *Explosive Ordnance Guide for Ukraine*, 2<sup>nd</sup> edition, September 2022, <https://www.gichd.org/en/resources/publications/detail/publication/explosive-ordnance-guide-for-ukraine-second-edition/> (accessed May 9, 2023).

<sup>11</sup> International Campaign to Ban Landmines, *Landmine Monitor Report*, Russia and Ukraine chapters, <https://www.the-monitor.org/en-gb/our-research/country-profiles.aspx> (accessed June 7, 2023).

<sup>12</sup> Human Rights Watch, *Background Briefing: Landmines in Ukraine*, June 2022, [https://www.hrw.org/sites/default/files/media\\_2022/06/Background%20Breifing\\_LandminesUkraine\\_2022.pdf](https://www.hrw.org/sites/default/files/media_2022/06/Background%20Breifing_LandminesUkraine_2022.pdf).

All manner of landmine delivery methods have been used except for air-delivered mines: hand-emplaced, mechanically laid, scattered by truck-mounted projectors and remotely delivered by rocket.

Factory markings on the landmines used by Russia show that they were manufactured in the Soviet era and subsequently in Russia; some antipersonnel mines were produced by Russia as recently as 2021.

Ukraine inherited a significant stockpile of landmines from the former Soviet Union but destroyed most of them.<sup>13</sup> It has also acquired several types of anti-vehicle mines from allied countries.

The 1997 Mine Ban Treaty prohibits antipersonnel mines but not anti-vehicle mines or command-detonated (remote-controlled) mines. Other international agreements, notably the 1996 Amended Protocol II of the Convention on Conventional Weapons (CCW), provides weak restrictions on the use of anti-vehicle mines.<sup>14</sup>

## Antipersonnel Landmines used in Ukraine

Russian forces have used at least 13 types of antipersonnel mines since February 24, 2022. In September, October, and December 2022, Human Rights Watch spoke with Ukrainian deminers who were involved in clearance operations in the Kharkivska region, including in Izium and in parts of the Khersonska region, following the retreat from those areas of Russian forces. They identified numerous types of antipersonnel mines they had found and neutralized in recently retaken areas, all of which are known to be in Russian stockpiles, including OZM-72 bounding fragmentation mines and PMN-series blast mines (both PMN-2 and PMN-4).<sup>15</sup>

Russian forces have also emplaced victim-activated booby-traps at positions that it has taken, occupied, or fortified over the past 16 months. Deminers told Human Rights Watch that they have cleared and destroyed multiple victim-activated booby traps from areas that were formerly under

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<sup>13</sup> Ukraine destroyed 3.4 million antipersonnel mines between 1999 and 2020, including PFM mines. See, for example, International Campaign to Ban Landmines, *Landmine Monitor Report (2021)*, Ukraine chapter, <http://www.the-monitor.org/en-gb/reports/2021/ukraine/mine-ban-policy.aspx> (accessed June 7, 2023). In 2021, Ukraine reported to the UN secretary-general that 3.3 million stockpiled PFM mines still need to be destroyed. See, for example, Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, Ukraine Article 7 Transparency Report, submitted April 25, 2022, file:///C:/Users/aboeids/Downloads/Ukraine%202022.pdf (accessed June 7, 2023).

<sup>14</sup> See, for example, Convention on the Prohibition of the Use, Stockpiling, Production and Transfer of Anti-Personnel Mines and on their Destruction, adopted September 18, 1997; United Nations Convention on Certain Conventional Weapons, Amended Protocol II, “Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices,” as amended on May 3, 1996.

<sup>15</sup> Human Rights Watch, *Ukraine: Banned Landmines Harm Civilians*, January 31, 2023.

Russian control. The booby traps were constructed with various types of hand grenades equipped with tripwires, including F-1, RGD-5, and RGN-type grenades. Booby-traps can function as antipersonnel mines when the fuze that is used is activated unintentionally by a person.

Ukrainian forces repeatedly used rocket-delivered PFM-series antipersonnel blast mines in attacks on and around the city of Iziurm in 2022 when Russian forces controlled the city and its environs. The use of antipersonnel mines by Ukraine is a violation of the 1997 Mine Ban Treaty.

Additionally, the United States has transferred command-detonated M18A1 Claymore directional fragmentation munitions to Ukraine, but without their victim-activated trip-wire fuzes.<sup>16</sup>

## Antipersonnel Landmines in Ukraine since February 24, 2022

Name	Origin	Type	Initiation	Notes
<a href="#">MOB</a>	Russia	Fragmentation	Multiple options	A modern hand-emplaced directional multi-purpose mine that is emplaced either in a command-detonated or victim-activated manner. When used in victim-activated mode with a mechanical pull, tension release, or seismic fuze, they are prohibited by the Mine Ban Treaty. This mine is only used by Russia.
<a href="#">MON-50</a>	USSR/Russia	Fragmentation	Tripwire/ command	The MON-series of hand-emplaced directional multi-purpose antipersonnel mines can be used either in a command-detonated or victim-activated manner. <sup>17</sup> When used in victim-activated mode with a mechanical pull, tension release, or seismic fuze, they are prohibited by the Mine Ban Treaty.
<a href="#">MON-90</a>	USSR/Russia	Fragmentation	Tripwire/ command	
<a href="#">MON-100</a>	USSR/Russia	Fragmentation	Tripwire/ command	

<sup>16</sup> US Department of Defense, “Fact Sheet on U.S. Security Assistance to Ukraine”, June 1, 2022, <https://www.defense.gov/News/Releases/Release/Article/3049483/fact-sheet-on-us-security-assistance-to-ukraine/> (accessed June 7, 2023).

<sup>17</sup> The numbers associated with each model of the MON family indicate the range, from 50 to 200 meters. According to Jane’s Mines and Mine Clearance (2008), each model contains a specific number of pre-formed fragments that are projected horizontally. The MON-50 contains 540 ball bearings or 485 pieces of 5mm chopped steel rod, and the MON-100 contains 400 pieces of 10mm chopped steel rod. Colin King, *Jane’s Mines and Mine Clearance 2008-2009* (Croydon: Jane’s Information Group, 2008).



Name	Origin	Type	Initiation	Notes
<a href="#">MON-200</a>	USSR/Russia	Fragmentation	Tripwire/ command	
<a href="#">OZM-72</a> <sup>18</sup>	USSR/Russia	Fragmentation	Tripwire/ command	A multi-purpose bounding munition emplaced either in a command-detonated or victim-activated manner. When used in victim-activated mode with a mechanical pull, tension release, or seismic fuze, they are prohibited by the Mine Ban Treaty.
<a href="#">PFM-1/</a> PFM-1S	USSR	Blast	Pressure, some SD	Uniquely shaped and constructed, this plastic-cased mine can be scattered by mine-laying rockets and dispensers mounted on trucks or helicopters. It contains 37 grams of a liquid high explosive. Both Russia and Ukraine stockpile this type.
<a href="#">PMN-2</a> <sup>19</sup>	USSR/Russia	Blast	Pressure	A circular, plastic-cased mine. Ukraine destroyed its stockpile of this type in 2003.
<a href="#">PMN-4</a> <sup>20</sup>	Russia	Blast	Pressure	Modern circular, plastic-cased mine produced by Russia. First publicly displayed by Russia in 1993, it has never been stockpiled by Ukraine.
<a href="#">POM-2/</a> POM-2R <sup>21</sup>	USSR/Russia	Fragmentation	Tripwire, SD	A metal-case bounding mine delivered by helicopter, ground-fired rockets, or other means. POM-2 and POM-2R mines are stockpiled by Russia, Ukraine destroyed its stocks of this mine in 2018.

<sup>18</sup> Trevor Kirton (@TJK\_EOD), Twitter, "Today the @OfficialSOLI EOD team was able to remote pull a live OZM-72 bounding fragmentation mine from a marsh located close to a farming community. This will be destroyed so it no longer presents a danger," April 21, 2023, [https://twitter.com/TJK\\_EOD/status/1649399596978716672?s=20](https://twitter.com/TJK_EOD/status/1649399596978716672?s=20) (accessed June 7, 2023).

<sup>19</sup> Maksim (kms\_d4k), Twitter, "In this footage, you can see why it is important not to touch any mines. These mines are set with a trap underneath. It is very dangerous to demine them, so the only way is to destroy them right away," February 6, 2023, [https://twitter.com/kms\\_d4k/status/1622588927998558212?s=20](https://twitter.com/kms_d4k/status/1622588927998558212?s=20) (accessed June 7, 2023).

<sup>20</sup> Mark Hiznay (@MarkHiznay), Twitter, "More PMN-4 antipersonnel mines being cleared. Since Ukraine never stockpiled this type, it doesn't take much to figure out who did it. Now where?," April 20, 2023, <https://twitter.com/MarkHiznay/status/1649091188673384448?s=20> (accessed June 7, 2023).

<sup>21</sup> Stu Miller (@SM\_EOD), Twitter, "More anti-personnel mines out of a field today. We have also come across more evidence of POM-2 use which adds another level of complexity to our work," April 21, 2023, [https://twitter.com/SM\\_EOD/status/1649336837985411073?s=20](https://twitter.com/SM_EOD/status/1649336837985411073?s=20) (accessed June 7, 2023).

Name	Origin	Type	Initiation	Notes
<a href="#">POM-3</a>	Russia	Fragmentation	Seismic	Used only by Russia, POM-3 mines were first publicly displayed during annual military exercises in 2021. <sup>22</sup> The POM-3 is scattered by rockets or truck-mounted launchers. Ukraine does not possess the POM-3 mine or its delivery system. Markings on an expended delivery canister pictured with POM-3 mines that failed to deploy properly indicate it was produced in 2021. <sup>23</sup>

Note: SD=self-destruct

## Anti-vehicle Landmines used in Ukraine

Both Russian and Ukrainian forces have used at least 13 types of anti-vehicle mines (also called anti-tank mines). Agricultural production is being negatively affected due to the use of landmines in fields and on rural paths and roads.

The hand or mechanically emplaced TM-62 series anti-vehicle blast mines equipped with an MVCh-62 pressure activated fuze appears to be the most common type of anti-vehicle mine used since Russia's full-scale invasion. These mines are often buried but are also seen laid on top of the ground.

Several countries supplying Ukraine with military assistance have transferred anti-vehicle mines to Ukraine, including Estonia, France, Germany, Sweden, the United Kingdom, and the United States.

<sup>22</sup> International Campaign to Ban Landmines, *Landmine Monitor Report (2021)*, Russia chapter, <http://www.the-monitor.org/en-gb/reports/2021/russian-federation/mine-ban-policy.aspx> (accessed June 7, 2023).

<sup>23</sup> The consultancy Armament Research Services has produced a detailed technical reference for POM-3 antipersonnel mines, see Mick F. and N.R. Jenzen-Jones, "Russian POM-3 anti-personnel landmines documented in Ukraine (2022)," *Armament Research Services*, <https://armamentresearch.com/russian-pom-3-anti-personnel-landmines-documented-in-ukraine-2022/> (accessed June 7, 2023).

## Anti-vehicle Landmines in Ukraine since February 24, 2022

Name	Origin	Type	Initiation	Notes
<a href="#">PTKM-1R</a> <sup>24</sup>	Russia	Shaped-charge, top-attack	Seismic sensor	Produced and used only by Russia, the mine cannister is hand-emplaced and its sensors detect the seismic and thermal signatures of vehicles to distances of 200 to 300 meters. Once a target is detected, a sensor-fuzed submunition is ejected into the air and scans for a target. Once a target is located a shaped charge is fired downwards onto the top of the target.
<a href="#">PTM-1/PTM-1G</a> <sup>25</sup>	USSR/Russia	Blast	Pressure, SD	A plastic-bodied, rectangular mine scattered by helicopter or rocket artillery (Grad/Uragan). Both Russia and Ukraine stockpile this type of mine
<a href="#">PTM-3</a> <sup>26</sup>	USSR/Russia	Shaped-charge	Magnetic Influence, SD	Rectangular, metal-cased mine scattered from individual tubes or truck-mounted, helicopter, and rocket dispensers. Only Russia stockpiles this type of mine.
<a href="#">PTM-4M</a>	Russia	Shaped-charge	Magnetic influence, SD/SDA	Modern metal-cased, rectangular mine scattered from individual tube or truck, helicopter, and rocket mounted dispensers. This mine has not been documented previously and the marking on the disperser indicates production in 2021. <sup>27</sup>

<sup>24</sup> Patrick Senft (@SenftPatrick), Twitter, "Another Russian PTKM-1R top-attack anti-tank mine discovered in the Ukraine War- apparently by EOD personnel from Ukraine. This one is unfired and was apparently manufactured in 2019," March 6, 2023, <https://twitter.com/SenftPatrick/status/1632697352107483137?s=20> (accessed June 7, 2023); Patrick Senft (@Senft Patrick), "Thanks to @eod205 for sharing more pictures of the Russian PTKM-1R top-attack mine from Ukraine. We can see the transport launcher after the warhead has been fired (left) and the control panels used to activate the mine (right)," November 26, 2023, <https://twitter.com/SenftPatrick/status/1596519881805299713?s=20> (accessed June 7, 2023).

<sup>25</sup> There is some disagreement among technical sources about the actual name of this mine type; other nomenclatures include: PTM-1, PTM-1S, and PGMDM.

<sup>26</sup> Simon\_uxo (@simon\_uxo), Twitter, "Russian footage of BTR-D vehicles ejecting anti-vehicle scatter mines in a zone. On the containers, you can read the word KPTM. These are PTM-3 anti-vehicle mines," May 22, 2023, [https://twitter.com/simon\\_uxo/status/1660570358750097409?s=20](https://twitter.com/simon_uxo/status/1660570358750097409?s=20) (accessed June 7, 2023).

<sup>27</sup> For further technical information, see PTM-4 Landmine Description, *Collective Awareness to UXO*, <https://cat-uxo.com/explosive-hazards/landmines/ptm-4-landmine> (accessed June 9, 2022); and KB PTM-4M, *Fenix Online*, <https://www.fenix-insight.online/munition/mine/kb-ptm-4m#> (accessed June 7, 2022).

Name	Origin	Type	Initiation	Notes
<a href="#">TM-62M</a>	USSR/Russia	Blast	Pressure	Large, metal-cased circular mine that is either hand emplaced or mechanically laid. In addition to the commonly seen MVCh-62 pressure fuze, it is compatible with many other types of fuzes. Both Russia and Ukraine possess this type.
<a href="#">TM-62P3</a>	USSR/Russia	Blast	Pressure	Large, plastic-cased circular mine that is either hand emplaced or mechanically laid. In addition to the commonly seen MVCh-62 pressure fuze, it is compatible with many other types of fuzes. Both Russia and Ukraine possess this type.
<a href="#">TM-83</a> <sup>28</sup>	USSR/Russia	Shaped-charge	Off-route, seismic, infra-red	Emplaced above the ground, this cylindrical metal-cased mine possessed by both Russia and Ukraine.
<a href="#">DM-22</a> , PARM-2 <sup>29</sup>	Germany	HE/AT	Off-route, SDA. Infra-red sensor, command, crush wire	Mounted above the ground on a tripod, this mine fires a high explosive/anti-tank (HE/AT) fin-stabilized projectile into its target.
DM-31, <a href="#">FFV-028</a> <sup>30</sup>	Germany, Sweden	Shaped charge	Magnetic Influence, SDA, some SD	A modern, metal-cased mine that is either hand-emplaced or mechanically laid.

<sup>28</sup> Command of the Support Forces of the Armed Forces of Ukraine, Facebook post, November 11, 2022, <https://www.facebook.com/photo?fbid=223415803347659&set=pcb.223415873347652> (accessed June 7, 2023).

<sup>29</sup> Patrick Senft (@SenftPatrick), Twitter, "Cool photo of a functioned German PARM DM-22 directional anti-tank mine in Ukraine. Germany transferred 1,600 DM-22s relatively early in the Russian Ukraine War. Some info on the mine and an image of its components," January 11, 2023, <https://twitter.com/SenftPatrick/status/1645856553352802304?s=20> (accessed June 7, 2023).

<sup>30</sup> Simon\_uxo (@simon\_uxo), Twitter, "A mined road found by russian forces. TM-62M, Danish M/56 and Dm-31 mines can be seen. Note that the DM-31 has been self-neutralized (red wire)," [https://twitter.com/simon\\_uxo/status/1634263519066464259?s=20](https://twitter.com/simon_uxo/status/1634263519066464259?s=20) (accessed June 7, 2023).

Name	Origin	Type	Initiation	Notes
<a href="#">DM-1399</a> , AT-2 <sup>31</sup>	Germany	Shaped charge	Magnetic Influence, scratch/contact wire, SD, SDA	A total of 28 of these mines are delivered by 227mm rocket. Using a small parachute to facilitate deployment, this landmine sits on the surface of the ground on five fold-out legs.
<a href="#">HPD-2A2</a> <sup>32</sup>	France	Shaped charge	Magnetic influence, SD, SDA	A modern, mechanically laid mine with a sensitive initiating sensor that could detonate the mine prematurely.
<a href="#">M/56</a> <sup>33</sup>	Denmark	Pressure	Pressure, tilt rod	A large, non-metal cased blast mine that is a copy of the French Model 1951/52 blast landmine.
PK-14 <sup>34</sup>	Estonia	Command detonated	Off-route, shaped charge	Also called M14, this item is emplaced above the ground.
<a href="#">RAAMS</a> <sup>35</sup>	USA	Shaped charge	Magnetic Influence, SD, SDA	Delivered by 155mm artillery projectile, each containing nine mines. The projectiles in this system have long or short duration self-destruct times: M718/M718A1

<sup>31</sup> Patrick Senft (@SenftPatrick), Twitter, "Some (likely German) AT-2 scatterable anti-tank mines in the Ukraine Russia War. According to Russian sources, they were found near Liman. We can see the parachute and the carrier munition. Each of these green tubes contains 4 mines - 28 per rocket," October 9, 2022, <https://twitter.com/SenftPatrick/status/1579096734378385408?s=20> (accessed June 7, 2023); Patrick Senft (@SenftPatrick), Twitter, "Russian forces in Ukraine have again encountered (likely German) AT-2 scatterable anti-tank mines near Svatove-Kreminna. Interestingly, the Russian soldiers are strongly discouraged from shooting at these mines to disable them (it seems to be fine with PFM-1s)," <https://twitter.com/SenftPatrick/status/1637043510502215680?s=20> (accessed June 7, 2023); Special Kherson Cat (@bayraktar\_1love), Twitter, "According to Russian sources, Ukraine is carrying out remote mining of the outskirts of Svatovo settlement using cluster rockets filled with AT2 anti-tank mines fired from MARS 2 MLRS," October 30, 2022, [https://twitter.com/bayraktar\\_1love/status/1586638562979729410?s=20](https://twitter.com/bayraktar_1love/status/1586638562979729410?s=20) (accessed June 7, 2023).

<sup>32</sup> Stepan Gronk (@StepanGronk), Twitter, "France supplies Ukraine with potent HPD-2 mines. The Ukrainian army has already mined approaches to positions near Opytnoye in Donetsk region with these mines, which are equipped with magnetic target sensors & designed to destroy all types of armored vehicles including tanks," August 16, 2022, <https://twitter.com/StepanGronk/status/1559407488813805568?s=20> (accessed June 7, 2023).

<sup>33</sup> Simon\_uxo (@simon-Uxo), Twitter, "A mined road found by Russian forces. TM-62M, Danish M/56 and Dm-31 mines can be seen. note that the DM-31 has been self-neutralized (red wire)," [https://twitter.com/simon\\_uxo/status/1634263519066464259?s=20](https://twitter.com/simon_uxo/status/1634263519066464259?s=20) (accessed June 7, 2023).

<sup>34</sup> Mark Hiznay (@MarkHiznay), Twitter, "Another entry for the landmines in Ukraine threat file...," September 9, 2022, <https://twitter.com/MarkHiznay/status/1568213892832149506?s=20> (accessed June 7, 2023).

<sup>35</sup> David Axe, "Ukraine's New Anti-Tank Tactic: Lay A Minefield, Then Scatter More Mines from the Air," *Forbes*, February 12, 2023, <https://www.forbes.com/sites/davidaxe/2023/02/12/ukraines-new-anti-tank-tactic-lay-a-minefield-then-scatter-more-mines-from-the-air/?sh=5b3c808b55e3> (accessed June 7, 2023); Necro Mancer (@666\_mancer), Twitter, "There are still such mines. They mined

Name	Origin	Type	Initiation	Notes
				(RAAM-L) SD time over 24 hours; M741/M741A1 (RAAM-S) SD time under 24 hours.

Note: SD=self-destruct; SDA=self-deactivate; RAAMS=Remote Anti-Armor Mine System

Many types of anti-vehicle mines, including some on this list, have devices, features, and characteristics designed to deter and attack military clearance efforts (called countermine) during combat. Some could have an antihandling device that causes the mine to explode from an unintentional or innocent act of a person. Others feature a fuzing mechanism that is sensitive enough to be activated and trigger the mine by the unintentional act of a person. Certain types of antivehicle mines rely on a tripwire, breakwire, or tilt rod as their sole initiating mechanism.<sup>36</sup>

No matter its label or design intent, there is widespread agreement that any explosive device that is capable of being detonated by the unintentional act of a person is an antipersonnel mine and thus prohibited under the Mine Ban Treaty. This is the view of a majority of the treaty’s 164 states parties and also shared by the International Committee of the Red Cross.<sup>37</sup>

## Impact of Landmines on Ukrainian Civilians

Ukraine’s contamination from landmines and explosive remnants of war (ERW) dates to World War II, worsened during armed conflict that began in 2014, and has expanded greatly since Russia’s full-scale invasion in February 2022.<sup>38</sup> In the current conflict, landmines have been used in at least 11 regions of Ukraine: Chernihivska, Dnipropetrovska, Donetska, Kharkivska, Khersonska, Kyivska, Luhanska, Mykolaivska, Odeska, Sumska, and Zaporizka.

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positions from a cassette around 10 days ago. They look like cans of canned goods, they hit with a cumulative one, in no case should they be destroyed by shooting,” February 10, 2023, [https://twitter.com/666\\_mancer/status/1624147223545057291?s=20](https://twitter.com/666_mancer/status/1624147223545057291?s=20) (accessed June 7, 2023).

<sup>36</sup> For more information on Anti-Vehicle Mines with Sensitive Fuzes or antihandling devices, see Human Rights Watch, *Antivehicle Mines with Sensitive Fuzes or Handling Devices*, February 25, 2002, <https://www.hrw.org/news/2002/02/25/antivehicle-mines-sensitive-fuzes-or-handling-devices>.

<sup>37</sup> “Anti-personnel landmines,” *International Committee of the Red Cross*, <https://www.icrc.org/en/war-and-law/weapons/anti-personnel-landmines> (accessed June 7, 2023).

<sup>38</sup> Explosive Remnants of War (ERW) are unexploded ordnance and abandoned explosive ordnance according to Protocol V of the Convention on Conventional Weapons (CCW).

Currently, there is no systematic reporting on the number of mine incidents and victims, nor is any disaggregated casualty information available publicly. Ukrainian Prime Minister Denys Shmyhal stated in April 2023 that about 174,000 square kilometers of Ukrainian land (larger than the total landmass of Greece) is now contaminated with explosive objects, which killed 226 people in the month of March 2023 alone in territory controlled by Ukraine.<sup>39</sup>

Three civilians were reportedly seriously injured by Russian landmines in three separate regions on March 17, 2023: a 57-year-old man in Kherson who was collecting firewood, the driver of a tractor in Chernihiv, and a 66-year-old woman walking in the forest in Izium, Kharkiv.<sup>40</sup>

In 2022, Ukraine fired numerous 9M27K3 mine-laying rockets carrying PFM antipersonnel mines into at least nine different Russian-occupied areas or near Russian military facilities in and around Izium city. Human Rights Watch researchers verified 11 civilian casualties from these mines, of which four people lost their foot or lower leg. One, a 77-year-old man, died some days after he was injured by a mine, although other factors beyond the mine-inflicted injuries may have contributed to his death. Local healthcare workers told investigators they had treated about 50 people for injuries from antipersonnel mines.

Other landmine casualties have been reported in the conflict in Ukraine, but many likely go unrecorded, especially if the victim was alone at the time of the incident. The impact of landmine use can also be seen in preventing civilians from accessing homes, infrastructure, transportation routes, and agricultural lands.

## Russia's Response

Russia has not joined the Mine Ban Treaty. In November 2020, it told the UN General Assembly that it “shares the goals of the treaty and supports a world free of mines,” but views antipersonnel mines “as an effective way of ensuring the security of Russia’s borders.”<sup>41</sup>

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<sup>39</sup> Statement by Prime Minister Denys Shmyhal at a Government session, Communications Department of the Secretariat of the Cabinet of Ministers of Ukraine, April 4, 2023, <https://www.kmu.gov.ua/en/news/promova-premier-ministra-ukrainy-denysa-shmyhalia-na-zasidanni-uriadu-04042023> (accessed April 26, 2023).

<sup>40</sup> Ukrainska Pravda, “Civilians blown up by landmines in three oblasts in one day,” *Yahoo News*, March 17, 2023, <https://news.yahoo.com/civilians-blown-landmines-three-oblasts-151027321.html> (accessed June 7, 2023).

<sup>41</sup> Russian Federation, Explanation of Vote on Resolution L.26, 75<sup>th</sup> Session, United Nations General Assembly First Committee Meeting, November 6, 2022, <https://media.un.org/en/asset/k1f/k1fq98ehwo> (accessed June 7, 2023).

Russia is party to the prohibitions and restrictions on mines, booby-traps, and other devices found in 1996 Amended Protocol II of the UN Convention on Conventional Weapons (CCW).<sup>42</sup> However, it has not reported any measures that it has taken to comply with Amended Protocol II (AP II) in its invasion of Ukraine, such as “feasible precautions” or steps necessary to ensure the effective exclusion of civilians from the areas such as fencing, signs, warnings, and monitoring, as required by article 5.2 of AP II.

Russia is also bound by prohibitions against deliberate, indiscriminate and disproportionate attacks against civilians found in the First Additional Protocol to the Geneva Conventions of 1949 (AP I)<sup>43</sup> and customary international humanitarian law.<sup>44</sup>

Belarus, which has supported Russia’s full-scale invasion of Ukraine, acceded to the Mine Ban Treaty on September 3, 2003.<sup>45</sup>

## Ukraine’s Response

Ukraine signed the Mine Ban Treaty on February 24, 1999 and ratified the treaty on December 27, 2005. Ukraine is also party to CCW Amended Protocol II but their obligations on antipersonnel mines are superseded by the stricter prohibitions contained in the Mine Ban Treaty.

Ukraine inherited a substantial stockpile of antipersonnel mines after the breakup of the Soviet Union. It destroyed more than 3.4 million antipersonnel mines between 1999 and 2020, including PFM mines. In 2021, Ukraine reported to the UN secretary-general that 3.3 million stockpiled PFM mines still need to be destroyed. According to Ukrainian officials, the only type of antipersonnel mines remaining in Ukraine’s stockpiles are PFM mines contained in 9M27K3 220mm rockets.

Human Rights Watch wrote to Ukrainian authorities on November 3, 2022 to present a summary of findings of its research into Ukraine’s apparent use of PFM-series antipersonnel mines in and around Izium during 2022. Deputy Defense Minister Oleksandr Polishchuk replied on November 24 and stated that Ukrainian authorities cannot comment on the types of weapons used during the

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<sup>42</sup> The United Nations Convention on Certain Conventional Weapons, Amended Protocol II, “Protocol on Prohibitions or Restrictions on the Use of Mines, Booby-Traps and Other Devices,” as amended on May 3, 1996.

<sup>43</sup> The International Committee of the Red Cross, Protocol Additional to the Geneva Conventions of 12 August 1949, and relating to the Protection of Victims of International Armed Conflicts (Protocol 1), June 8, 1977, <https://ihl-databases.icrc.org/ihl/INTRO/470> (accessed June 7, 2023).

<sup>44</sup> International Committee of the Red Cross, Customary International Humanitarian Law Database (volumes I and II), 2005, <https://ihl-databases.icrc.org/customary-ihl/eng/docs/home> (accessed June 7, 2023).

<sup>45</sup> International Campaign to Ban Landmines, *Landmine Monitor Report 2019*, Belarus chapter, <http://www.the-monitor.org/en-gb/reports/2021/belarus/mine-ban-policy.aspx> (accessed June 7, 2023).



armed conflict “before the end of the war and the restoration of our sovereignty and territorial integrity.” The letter stated, “Ukraine is a reliable member of the international community, and it fully commits to all international obligations in the sphere of mine usage. This includes the non-use of anti-personnel mines in the war.”<sup>46</sup>

The deputy minister also wrote:

[D]uring the course of the war, Ukraine's Armed Forces strictly adhered to the standards of IHL [international humanitarian law] and provisions of the international conventions to which Ukraine is a party. This includes, inter alia, the Convention on the Prohibition of the Use, Stockpiling, Production... (hereinafter the Ottawa Convention), as well as the Convention on Certain Conventional Weapons, which are considered excessively injurious or whose effects are indiscriminate.<sup>47</sup>

On January 31, 2023, in response to Human Rights Watch’s report about Ukraine’s PFM-series antipersonnel mine use, the Ministry of Foreign Affairs stated that the findings “will be duly studied by the competent authorities of Ukraine.”<sup>48</sup> The government has not provided any subsequent updates, though it is expected to address the matter, including steps it has taken, at the next intersessional meeting of the Mine Ban Treaty on June 19-21 in Geneva.<sup>49</sup>

## International Response

All parties to the conflict in Ukraine are bound by treaties that prohibit or regulate landmines in addition to the general laws of war. The 1997 Mine Ban Treaty comprehensively prohibits all types of victim-activated explosive devices, regardless of the technical features and regardless of the mine’s predicted longevity, delivery method, or type of manufacture (improvised or factory-made).

The 20<sup>th</sup> Meeting of States Parties to the Mine Ban Treaty in November 2022 “condemned the use of anti-personnel mines anywhere, at any time, and by any actor.” Since March 28, 2022, Ukraine

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<sup>46</sup> Response letter from the Ukrainian Ministry of Defense, “Regarding the meeting on the use of anti-personnel landmines,” January 2023,

[https://www.hrw.org/sites/default/files/media\\_2023/01/Defense%20Ministry%20Response%201.%20%20Do%9B%Do%B8%D1%81%D1%82%5B7%5D\\_0.pdf](https://www.hrw.org/sites/default/files/media_2023/01/Defense%20Ministry%20Response%201.%20%20Do%9B%Do%B8%D1%81%D1%82%5B7%5D_0.pdf) (accessed June 7, 2023).

<sup>47</sup> Ibid.

<sup>48</sup> “Comment of the Ministry of Foreign Affairs regarding Report of the Human Rights Watch,” Ministry of Foreign Affairs of Ukraine, January 31, 2023, <https://mfa.gov.ua/en/news/komentar-mzs-ukrayini-shchodo-zvitu-organizaciyi-human-rights-watch> (accessed June 7, 2023).

<sup>49</sup> On June 21, the Committee on Cooperative Compliance will present its activities and invite states parties with alleged or known treaty non-compliance to provide an update on their efforts to address these matters.

and at least 40 other countries have condemned or expressed concern at Russia's use of antipersonnel landmines in Ukraine: Albania, Austria, Australia, Belgium, Bosnia and Herzegovina, Bulgaria, Canada, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Georgia, Greece, Guatemala, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, North Macedonia, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, South Korea, Spain, Sweden, Switzerland, United Kingdom, United States, and the European Union.

Landmine use in Ukraine has also been condemned by successive Mine Ban Treaty presidents as well as the special envoy for universalization.<sup>50</sup> On February 3, 2023, the president of the Mine Ban Treaty, Ambassador Thomas Göbel of Germany, expressed concern at the alleged use of antipersonnel mines by members of the Ukrainian armed forces as reported by Human Rights Watch. In a statement, he said that he will work "together with the Convention's Committee on Cooperative Compliance" to "use the established procedures to seek clarification of the allegations." He said, "We are confident that we can continue to fully rely on Ukraine's cooperation in this respect."<sup>51</sup>

The International Campaign to Ban Landmines, 1997 Nobel Peace Laureate, has condemned the use of antipersonnel landmines in Ukraine, as has its member organizations, including its chair, Human Rights Watch.<sup>52</sup>

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<sup>50</sup> "President of the Convention that bans landmines calls for immediate cease of use of this insidious weapon in Ukraine," Antipersonnel Mine Ban Convention, April 5, 2022, <https://www.apminebanconvention.org/en/newsroom/article/article/president-of-the-convention-that-bans-landmines-calls-for-immediate-cease-of-use-of-this-insidious-w/> (accessed June 7, 2023).

<sup>51</sup> "Landmine treaty president to engage with Ukraine on alleged use of prohibited weapon," Anti-Personnel Mine Ban Convention, February 3, 2023, <https://www.apminebanconvention.org/en/newsroom/article/article/landmine-treaty-president-to-engage-with-ukraine-on-allegations-of-use-of-prohibited-weapon/> (accessed June 7, 2023).

<sup>52</sup> International Campaign to Ban Landmines, "Russian Uses Banned Antipersonnel Mines in Ukraine: ICBL-CMC Calls for International Condemnation and Immediate End to Use," March 30, 2022, <http://www.icbl.org/en-gb/news-and-events/news/2022/russia-uses-banned-antipersonnel-mines-in-ukraine-icbl-cmc-calls-for-international-condemnation-and-immediate-end-to-use.aspx> (accessed June 7, 2023).

