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Patterns of Explosive Weapon Use in Ukraine

When Russia invaded Ukraine, on Thursday 24 February 2022, it was the culmination of years of Russian-sponsored separatist violence in the country's eastern regions, and it brought about acute shifts in the patterns of use and the patterns of harm associated with explosive weapons on Ukrainian territory.

Action on Armed Violence, or AOAV, has been collecting data on the impacts of explosive weapons use, as reported in English-language news sources, since 2010. We record data on manufactured explosive weapons, IEDs, as well as stockpile explosions and UXOs. This has enabled, and continues to enable, researchers to develop a bird's eye view of the way patterns of harm associated with explosive weapons evolve globally.

In Ukraine, a review of the data collected since 2014, when Russia first became actively involved in the separatist violence in the east, highlights the different ways explosive weapons are respectively used and caused harm in cold versus hot conflicts.

AOAV's data is collected using an incident-based methodology, adapted from the one used by Landmine Action and Medact in 2009. Our data on explosive violence incidents is gathered from English-language media reports on the following factors: the date, time, and location of the incident; the number and circumstances of people killed and injured; the weapon type; the reported user and target; the detonation method and whether displacement or damage to the location was reported. Because of the nature of the source material, AOAV does not claim to have captured every explosive incident, but the data is comprehensive enough to reveal patterns of harm over time.

For the purposes of this report, AOAV is focused on capturing incidents caused by the intentional use of explosive weapons. The data analysed here, therefore, does not include accidental detonations, explosive weapons that failed to explode as intended and remain UXOs, or poorly secured or stockpiled explosive weapons that cause unintended harm to civilians.

Naturally, AOAV's methodology is subject to a number of limitations and biases, mostly centered around the nature of the source material. Data and emerging trends and patterns are contingent on different levels of reporting across regions and countries. Under-reporting is likely in many contexts. Only English-language media reports are used, which does not provide a comprehensive picture of explosive weapon use around the world. On the other hand, the ongoing conflict in Ukraine has demonstrated the power that access and social media can play in generating previously unseen levels of coverage. It is likely that the transition to a hot conflict, and the relative accessibility to the front in the early days of the war, have expanded both the audience and the reporting capacity (and will). Some of the increase in incidents recorded in Ukraine following on from Russia's invasion may be attributable to the greater global interest and more intense reporting.

Furthermore, while AOAV records military casualties as well as civilian casualties, we recognise that military casualties are often under-reported, both for strategic and intelligence reasons, and reasons of readership. In Ukraine in particular, military casualties are rarely reported in incident and location-specific ways. Rather, they are reported in agglomerated accounts referring to military operation zones rather than the administrative regions AOAV requires. For these reasons, based on our methodology, we cannot record even those military casualties which are reported. Consequently, patterns regarding the locations and weapons associated with military casualties in Ukraine are likely to be either suggestive at best, or more representative of exceptional incidents.

On to the actually interesting bit.

From 2014 to 23 Feb 2022, AOAV recorded 1,069 incidents of explosive weapon use in Ukraine, which resulted in a total of 5,327 reported casualties, of which 2,740 were civilians and 2,587 were armed actors. From 24 Feb to 01 Sept, we recorded 931 incidents, and 7,689 casualties, of which 6,678 are civilians and 1,011 are armed actors (mainly military).

Straight off the bat, we can see that incidents of explosive weapon use have been more harmful since the invasion, with an average of 5 casualties per incidents prior to the invasion and 8 since. And, of course, the frequency of incidents has increased massively.

ACTORS

The most dramatic change is visible in patterns relating to the users of explosive weapons in Ukraine. Prior to the invasion, non-state actors, almost exclusively Ukrainian separatists, Russian proxies, and Russian mercenaries, were the reported users in the case of 62% of incidents, compared to 1% since. Correspondingly, state actors, mostly Ukraine, were the reported users in 16% of cases, while state actors, primarily Russia, are currently the reported users in 96% of cases. Russian-perpetrated incidents of explosive weapon use rose from <1% to 92% of incidents. It definitely reflects the shift from a Russian proxy-war to a direct war.

In more detail:

<u>Prior to the invasion</u>

ANSA: 62% (661) incidents

- Ukrainian separatists, Russian proxies, Russian mercenaries

State: 16% (173) incidents

- Russia: 1% (16)
- Ukraine: 15% (157)

Unknown: 22% (235) incidents

ANSA: 27% (739) civ cas

State: 29% (789) civ cas

- Russia: <1% (3)
- Ukraine: 29% (786)

Unknown: 44% (1,212) civ cas

ANSA: 76% (1,974) aa cas

State: 13% (343) aa cas

- Russia: 1% (30)
- Ukraine: 12% (313)

Unknown: 10% (270)

Since the invasion

ANSA: 1% (11) incidents

- Ukrainian resistance

State: 96% (898) incidents

- Russia: 92% (861)
- Ukraine: 3% (29)

Unknown: 2% (22)

ANSA: <1% (18) civ cas

State: 99% (6,603) civ cas

- Russia: 92% (6,140)
- Ukraine: 4% (273)
- UA: 3% (190)

Unknown: <1% (53)

ANSA: <1% (6) aa cas

State: 99% (1001) aa cas

- Russia: 51% (519)
- Ukraine: 46% (470)

Unknown: <1% (4)

LOCATIONS

The locations of explosive weapon use have also seen an acute shift. Prior to the invasion, 37% of incidents occurred in populated areas, compared to 90% since. Incidents are coded as having occurred in populated areas when they are reported as happening in areas likely to contain concentrations of civilians *[in or near commercial premises, entertainment venues, hospitals, encampments (of IDPs, refugees, nomads), markets, places of worship, police stations, public gatherings, public buildings, public transport, schools, town centres, urban residential neighbourhoods, villages]*, locations described as crowded or busy, or in a location classed as an agricultural area, armed base, road, or transport related infrastructure if they were located in or next to locations considered to be populated.

The percentage of casualties in populated areas who were civilians has also increased, from 84% prior to the invasion, to 99% since. The most notable shift in location patterns revolves around incidents recorded in urban residential areas, which refers to incidents coded as having occurred in a residential area within a town or city, a person's home within a town, or when an incident is referred to as having occurred in a 'neighbourhood.' AOAV recorded 16% of incidents in URAs prior to the invasion, compared to 43% since.

To break it down:

<u>Until 24 February</u>
37% (395) of incidents occurred in P.A; 54% (2,894) of casualties occurred in P.A.
88% (2,417) civ cas occurred in populated areas; civilians = 84% casualties in P.A
18% (477) aa cas occurred in populated areas

59% (633) total incidents: no information
14% (150) incidents: urban residential
7% (78) incidents: villages

32% (868) total civ cas: multiple urban
16% (425) civ cas: urban residential
15% (402) civ cas: public transport

64% (1,667) total aa cas: no information
12% (320) aa cas: armed base
11% (291) aa cas: multiple urban

<u>Since 24 February</u>
89% (833) of incidents occurred in P.A; 84% (6,424) of total casualties occurred in P.A.
95% (6,368) civ cas occurred in P.A; civilians = 99% casualties in P.A (6,424)
6% (56) aa cas occurred in P.A

43% (402) total incidents: urban residential
26% (238) incidents: multiple urban
10% (91) incidents: village

32% (2,154) total civ cas: multiple urban
28% (1,901) civ cas: urban residential
9% (621) civ cas: entertainment venue

82% (832) total aa cas: armed base
12% (117) aa cas: no information
2% (23) aa cas: school

GROUND-LAUNCHED WEAPONS

Regarding the use of ground-launched weapons in Ukraine, we see them used in a lower percentage of incidents now than prior to the invasion, but they are used more frequently in populated areas. While they were used in 88% of incidents prior to 24 February, we now see them being used in 77%, however, they accounted for 37% of incidents in populated areas prior to the invasion, but currently account for 93% of incidents in populated areas. What's also interesting is that the percentage of casualties attributed to ground-launched weapons has decreased since the invasion, reflecting the involvement of a wider variety of explosive weapons in the conflict. As you can see, 88% of casualties were attributed to ground-launched weapons prior to the invasion, compared to 61% now.

Looking at it in more detail:

<u>Before the invasion:</u>
88% (936) incidents
90% (2,468) civ cas
87% (2,239) aa cas
Total cas: 88% (4,707) total EW cas

61% (655) total incidents: shelling
8% (87) incidents: mortar
6% (69) incidents: artillery shell

31% (846) total civ cas: shelling

13% (369) civ cas: artillery
13% (349) civ cas: rocket

52% (1,336) total aa cas: shelling
9% (226) aa cas: multiple
7% (188) aa cas: artillery

37% (348) incidents ground-launched weapons in populated areas
90% (2,210) civ cas of GL occurred in PA; civilians = 84% casualties when GL used in PA (2,640)
81% (1,809) aa cas of GL occurred in PA

Since the invasion:
77% (716) incidents
65% (4,329) civ cas
32% (325) aa cas
Total cas: 61% (4,654) total EW cas

56% (525) total incidents: shelling
7% (68) incidents: rocket
6% (53) incidents: artillery shell

44% (2,927) total civ cas: shelling
9% (617) civ cas: rocket
7% (449) civ cas: missile

15% (149) total aa cas: missile
6% (64) aa cas: shelling
5% (51) aa cas: grende

93% (666) incidents ground-launched weapons in populated areas
95% (4,097) civ cas of GL occurred in PA; civilians = 99% casualties when GL used in PA (4,127)
9% (30) aa cas of GL occurred in PA

AIR-LAUNCHED WEAPONS

In correspondence with the decreased frequency of ground-launched weapon use, we see a rise in the use of air-launched weapons. While they were used in 2% of incidents prior to 24 February, we now see them being used in 9%. Furthermore, they accounted for 65% of incidents in populated areas prior to the invasion, but currently account for 87% of incidents in populated areas. Reflecting the diversification of explosive weapons use in Ukraine, 3% of casualties were attributed to air-launched weapons prior to the invasion, compared to 27% now.

<u>Before 24 February:</u>
2% (17) incidents
3% (93) civ cas
2% (45) aa cas
Total cas: 3% (138) total EW cas

<1% (9) total incidents: air strike
<1% (7) incidents: air-dropped bomb
<1% (1) incidents: rocket

1% (39) total civ cas: air strike
1% (35) civ cas: air dropped bomb
<1% (19) civ cas: rocket

2% (40) total aa cas: air strike
<1% (5) aa cas: air dropped bomb

65% (11) incidents air-launched weapons in populated areas
100% (93) civ cas of AL occurred in PA; civilians = 100% casualties when AL used in PA (93)
% (0) aa cas of AL occurred in PA

<u>Since 24 February</u>
9% (84) incidents
22% (1,490) civ cas

55% (557) aa cas
Total cas: 27% (2,047) total EW cas

6% (55) total incidents: air strike
3% (25) incidents: missile
<1% (4) incidents: rocket

18% (1,195) total civ cas: air strike
4% (283) civ cas: missile
<1% (12) civ cas: rocket

45% (456) total aa cas: air strike
10% (100) aa cas: rocket
<1% (1) aa cas: missile

87% (73) incidents air-launched weapons in populated areas
100% (1,485) civ cas of AL occurred in PA; civilians = 100% casualties when AL used in PA (1,489)
<1% (4) aa cas of AL occurred in PA

If time (slightly less interesting but still intriguing)

MINES
From 4% to 3% of incidents of EWU
From 19% to 19% in populated areas
From 2% to <1% civ cas
From 3% to <1% of aa cas

<u>Pre Feb 2022</u>
4% (43) incidents
2% (49) civ cas
3% (89) aa cas
Total cas: 3% (138) total EW cas

19% (8) incidents mines in populated areas
29% (14) civ cas of mines occurred in PA; civilians = 52% casualties when IED used in PA (27)
15% (13) aa cas of mines occurred in PA

Post Feb 2022
3% (26) incidents
<1% (56) civ cas
<1% (9) aa cas
Total cas: <1% (65) total EW cas

19% (5) incidents mines in populated areas
21% (12) civ cas of mines occurred in PA; civilians = 86% casualties when IED used in PA (14)
22% (2) aa cas of mines occurred in PA

IEDS
From 6% to 1% of incidents of EWU
From 38% to 69% in populated areas
From 4% to <1% civ cas
From 4% to 1% of aa cas

How IEDs are coded:

- Non-specific IED: The broadest recording category for all explosive weapons made from non-traditional means of manufacture. Refers to all IEDs which could not be categorised as either ‘roadside bombs’ or ‘car bombs.’
- Roadside bomb: IEDs which were either specifically reported as ‘roadside bombs’ or where an IED was reported to be used alongside a road and no further information was provided. If the location for an IED incident is coded as ‘road’ this field should be recorded as ‘roadside bomb’ unless explicitly stated otherwise, e.g. “A car bomb detonated on a road in Anbar, Iraq” would not be coded as a roadside bomb.
- Car bomb: Incidents where the IED was clearly described as a ‘car bomb’, or where other vehicles like trucks were used to transport an IED. Can be stationary or moving. IEDs which are reported as being attached to vehicles, for example, a sticky bomb attached to a politician’s car or a remote control IED attached to a bicycle, are recorded as ‘Non-specific IEDs.’

Pre Feb 2022

6% (66) incidents

4% (107) civ cas

4% (107) aa cas

Total cas: 4% (214) total EW cas

5% (50) total incidents: non-specific IED

1% (11) incidents: car bomb

<1% (5) incidents: roadside bomb

3% (82) total civ cas: non-specific IED

<1% (22) civ cas: car bomb

<1% (3) civ cas: roadside bomb

3% (71) total aa cas: non-specific IED

1% (26) aa cas: roadside bomb

<1% (10) aa cas: car bomb

38% (25) incidents IED in populated areas

86% (92) civ cas of IEDs occurred in PA; civilians = 88% casualties when IED used in PA (105)

12% (13) aa cas of IED occurred in PA

Post Feb 2022

1% (13) incidents

<1% (26) civ cas

1% (6) aa cas

Total cas: <1% (32) total EW cas

1% (10) total incidents: non-specific IED

<1% (2) incidents: car bomb

<1% (1) incidents: roadside bomb

<1% (22) total civ cas: non-specific IED
<1% (4) civ cas: car bomb

<1% (4) total aa cas: non-specific IED
<1% (2) aa cas: roadside bomb

69% (9) incidents IED in populated areas
65% (17) civ cas of IEDs occurred in PA; civilians = 74% casualties when IED used in PA (23)
6% (100) aa cas of IED occurred in PA