Technical Briefing Note

Use of Cluster Munitions in Syria

April 4, 2014

The Syrian government’s extensive use of cluster munitions has caused numerous casualties, damaged infrastructure, and is resulting in a deadly legacy of explosive remnants of war that will pose dangers to civilians for years to come. Human Rights Watch has identified at least 224 locations in 10 of Syria’s 14 governorates where cluster munitions have been used between July 2012 and March 2014. At least six types of cluster munitions and seven types of explosive submunitions have been used in the conflict to date.

Syria is not a party to the 2008 Convention on Cluster Munitions, but its cluster munition use has attracted widespread media coverage, public outcry, and condemnations from approximately 130 countries.

This Technical Briefing Note looks at the chronology, locations, and types of cluster munitions used in Syria.

Methodology
Since 2012, Human Rights Watch has systematically researched, recorded, and documented the use of cluster munitions in Syria. It has reviewed evidence from a number of sources, including:

- More than 500 videos and images posted by local activists on social media websites such as YouTube and Facebook, assembled and categorized with the assistance of Elliot Higgins of the Brown Moses Blog;
- Witness accounts collected by Human Rights Watch researchers regarding casualties and humanitarian impact;
- Reports and blog posts by journalists, local NGOs, and other collaborators.¹

For each video, or group of videos documenting the same attack, Human Rights Watch attempted to identify the type of cluster munition and explosive submunition used, and its method of

delivery—by aircraft, including helicopters, or surface-to-surface rockets. This analysis provides an indication of the scale of cluster munition use, but the data is incomplete as not all remnants are likely to have been recorded on video and the actual number of cluster munitions used in Syria is most probably much higher.

Chronology of cluster munition use since 2012
The first indications that Syrian government forces were using cluster munitions emerged in July 2012 with reports of air-dropped cluster bombs being used in Jabal Shahshabu, a mountainous area near Hama. Further cluster munition use by government forces increased especially during a wave of air strikes that began in October 2012. Evidence of the continued use of cluster munition persists to date, including the use of more recently manufactured and modern cluster munition types, such as submunitions with self-destruct mechanisms. The date and location of the earliest appearance of each submunition type and the type of cluster munition used to deliver them is detailed in the following timeline.

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Cluster Munition</th>
<th>Submunition Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 2012</td>
<td>Jabal Shahshabu, Hama</td>
<td>RBK-250-275 AO-1SCh bomb</td>
<td>AO-1SCh fragmentation</td>
</tr>
<tr>
<td>August 2012</td>
<td>Talbiseh, Homs &amp; Abu Kamal, Deir al-Zour</td>
<td>RBK-250 PTAB-2.5M bomb</td>
<td>PTAB-2.5M high explosive/anti-tank</td>
</tr>
<tr>
<td>December 2012</td>
<td>Jabal al-Zaweya, Idlib &amp; Latamneh, Hama</td>
<td>SAKR 122mm rocket</td>
<td>M77-type DPICM</td>
</tr>
<tr>
<td>March 2013</td>
<td>Heish, Idlib</td>
<td>RBK-500 ShOAB-0.5 bomb</td>
<td>ShOAB-0.5 fragmentation</td>
</tr>
<tr>
<td>May 2013</td>
<td>Unclear</td>
<td>Not known</td>
<td>PTAB-2.5KO high explosive/anti-tank</td>
</tr>
<tr>
<td>June 2013</td>
<td>Harbnafeh, Hama</td>
<td>Not known</td>
<td>AO-2.5RT fragmentation</td>
</tr>
<tr>
<td>February 2014</td>
<td>Keferzita, Hama</td>
<td>9M55K 300mm rocket</td>
<td>9N235 fragmentation</td>
</tr>
<tr>
<td>February 2014</td>
<td>Namar, Daraa</td>
<td>9M27K-series 220mm rocket</td>
<td>Not determined</td>
</tr>
</tbody>
</table>
Locations of cluster munition use

As of March 2014, cluster munition strikes have been identified at 224 locations in 10 of 14 of Syria’s governorates. Another 34 strike locations have been documented but it is not possible to discern if they are unique strikes or different views of already documented strikes.

At least seven types of explosive submunitions have been identified. These originate from at least three different types of air-dropped bombs and three different surface-to-surface rocket systems. The geographic distribution of the 224 identified cluster munition strikes sorted by governorate is illustrated in the following chart.

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2 Additionally, ZAB incendiary submunitions delivered by RBK bombs have been used by government forces. However, this type is not accounted for in this briefing note since this type is not considered to be an explosive submunition since the ZAB submunitions ignite after release from its container instead of detonating on, before, or after impact. These weapons are not listed in this Technical Briefing Note as they are not covered by the Convention on Cluster Munitions. For further information on Syria’s use of incendiary weapons, see: http://www.hrw.org/sites/default/files/reports/syria13Final_0.pdf.

3 For two of the types of air-delivered submunitions it is not possible to ascertain what type of delivery system was used since evidence of the canister that dispersed them is not available. Also, the type of submunition delivered by one surface-to-surface rocket system has not been identified.
Types of cluster munitions used in Syria
For over 100 of the 224 documented strike locations it is possible to identify the cluster munition and submunition type used. In the other cases, remnants of cluster munitions were present, but it was not possible to identify the specific type used. Nonetheless, the most frequently-seen cluster munition remnant in these latter cases was the tail unit of the RBK-250 series bomb, a component common to the cluster bombs containing PTAB-2.5M and AO-1SCh submunitions.

Some of the identified submunitions have been used in multiple locations as summarized in the following table and in further detail in Appendix 1.

<table>
<thead>
<tr>
<th>Submunition Type</th>
<th>Frequency, by Governorate</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTAB-2.5M</td>
<td>47 locations in 9 governorates</td>
</tr>
<tr>
<td>AO-1SCh</td>
<td>39 locations in 10 governorates</td>
</tr>
<tr>
<td>AO-2.5RT</td>
<td>5 locations in 3 governorates</td>
</tr>
<tr>
<td>ShOAB-0.5</td>
<td>4 locations in 3 governorates</td>
</tr>
<tr>
<td>9M27K rocket (submunition type unknown)</td>
<td>3 locations in 1 governorate</td>
</tr>
<tr>
<td>9N235</td>
<td>1 location in 1 governorate</td>
</tr>
</tbody>
</table>

The origins and ages of the cluster munitions and explosive submunitions used in Syria are diverse. It is not known how or when Syria acquired its stockpile of cluster munitions.

- A review of the markings on the RBK series bombs and the AO-1SCh, PTAB-2.5M, and ShOAB-0.5 submunitions contained inside them, as well as a comparison with the Soviet manuals for the weapons, show that they were manufactured in the 1970s and early 1980s at Soviet state munitions factories.
- The method of delivering AO-2.5RT and PTAB-2.5KO submunitions is not known since remnants of a delivery system have not been documented. Both are capable of being loaded into BKF cartridges, which are subsequently dispersed by KMG-U dispensers. Additionally, the AO-2.5RT submunition can be delivered by a 500-kilogram sized RBK series cluster bomb. Both systems were developed, produced and deployed by the Soviet Union in the 1980s.
- The 122mm SAKR cluster munition rockets containing DPICM submunitions bear the markings of the Egyptian state-owned Arab Organization for Industrialization and an Egyptian company called Sakr Factory for Development Industries. It is not known if the
122mm rockets are SAKR-18 or SAKR-36 variants, which contain 72 and 98 submunitions respectively.

- The 9M55K 330mm cluster munition rocket was designed and initially manufactured by the Soviet Union in the late 1980s and then manufactured and exported by the Russian Federal State Unitary Enterprise “SPLAV State Research And Production Association” from 1991 onward.
- The sections of the cargo-carrying payload portion of 9M27K 220mm rockets have also been documented in the remnants of attacks indicating yet another delivery system has been used. However, there is no evidence of the submunition type which the system is capable of delivering, including antipersonnel fragmentation submunitions.

Responses to cluster munition use in Syria
The Syrian military initially denied possessing or using cluster munitions, but no longer appears to respond to reports of its use of the weapons.\(^4\) Syria is not a party to the 2008 Convention on Cluster Munitions, but its cluster munition use has attracted widespread media coverage, public outcry, and condemnations from approximately 130 countries.\(^5\)

It does not appear that cluster munitions have been used by opposition rebel groups, but there is some evidence of unexploded submunitions being used as improvised explosive devices (IEDs) by some rebel groups.\(^6\)

For more information, see:
This Technical Briefing Note does not detail casualties from cluster munition use in Syria as it is only a partial general survey based on limited access and sources, but Human Rights Watch has documented cluster munition casualties in numerous statements issued on the use of cluster munitions in Syria, including:


\(^6\) This video uploaded to YouTube on March 26 of arms captured by government forces from rebel groups shows submunitions prepared for use as IEDs: http://youtu.be/UTwbnoRQodc.
  http://www.hrw.org/news/2013/04/10/syria-aerial-attacks-strike-civilians
  http://www.hrw.org/news/2013/03/16/syria-mounting-casualties-cluster-munitions
  http://www.hrw.org/news/2013/01/14/syria-army-using-new-type-cluster-munition
Appendix 1: Locations of Identified Cluster Munition Strikes, by Submunition and Governorate

This listing shows the locations in each governorate where unexploded submunitions have been identified, sometime one more than one occasion.

<table>
<thead>
<tr>
<th>PTAB-2.5M</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aleppo</strong></td>
</tr>
<tr>
<td>Al-Bab (2)</td>
</tr>
<tr>
<td>Azaz</td>
</tr>
<tr>
<td>Mar’a (2)</td>
</tr>
<tr>
<td>Mar’anaz</td>
</tr>
<tr>
<td>Meng (2)</td>
</tr>
<tr>
<td>Sawran</td>
</tr>
<tr>
<td>Sheikh Saeed</td>
</tr>
<tr>
<td>Sukkari</td>
</tr>
<tr>
<td>Tel Rifaat</td>
</tr>
<tr>
<td>Hanano</td>
</tr>
<tr>
<td>Marjeh</td>
</tr>
<tr>
<td><strong>Homs</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Raqqa</td>
</tr>
<tr>
<td>Al-Tabqah</td>
</tr>
<tr>
<td><strong>Daraa</strong></td>
</tr>
<tr>
<td>Bosra</td>
</tr>
<tr>
<td>Naseeb</td>
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<tr>
<td></td>
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<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>AO-1SCh</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aleppo</strong></td>
</tr>
<tr>
<td>Tariq al-Bab</td>
</tr>
<tr>
<td>Urm Al-Kubra</td>
</tr>
<tr>
<td>Hanano</td>
</tr>
</tbody>
</table>
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AO-2.5RT

<table>
<thead>
<tr>
<th>Daraa</th>
<th>Hama</th>
<th>Homs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tafas</td>
<td>Harbinafsah</td>
<td>Aqaribat</td>
</tr>
</tbody>
</table>

ShOAB-0.5

<table>
<thead>
<tr>
<th>Aleppo</th>
<th>Homs</th>
<th>Abu ad-Dahur</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kuweriss military airport</td>
<td>Dar al-Kebira</td>
<td>Haysh</td>
</tr>
<tr>
<td></td>
<td>Idlib</td>
<td></td>
</tr>
</tbody>
</table>

9N235

<table>
<thead>
<tr>
<th>Hama</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kafar Zitna</td>
</tr>
</tbody>
</table>

9M27K-series

<table>
<thead>
<tr>
<th>Daraa</th>
</tr>
</thead>
</table>
Unknown Submunition Type

**Aleppo**
8th Army Brigade
Base
Aleppo Airport
Al-Maysar
As-Safeera (3)
Bani Zeid
Dara Aza
Jirah Airbase
Khan Al-Assal
Madrasa al-Masha
Tel Rifaat (2)

**Deir al-Zour**
Abu Kamal
Al-Mara’iyah (2)
Deir al-Zour
Deir al-Zour Airport (2)
Kabbajb

**Hama**
Kafar An Baudah (2)
Kafar Zitna
Kernaz
Qal‘at al-Madiq

**Isqaat**
Jisr as-Sugur
Ma’arr Shamshah
Martyr’s Brigade
Qrsaa
Salkeen
Shelekh
Taftanaz (2)

**Latakia**
Rabiyah

**Raqqa**
At-Tabqah (2)
Raqqah (3)

**Homs**
Abil (4)
Az-Zafaraneah, ar-
Rastan (3)
Eastern Bouwayda (5)
Hay ar-Rabia al-Arabii
Houla
Jobar (2)
Az-Zara

**Damascus Countryside**
Ain Terma
Al-Bahariyah
Babbila
Daraya (2)
Dayr al-Asafir (2)
Douma (2)
Erbeen (5)
Hamouriah (3)
Harasta (2)
Harran al’Awamid
Jesreen
Jobar
Moadamiyah
Malihah (3)
Mesraba (2)
Yabroud

**Daraa**
Abbasid
Al-Gharya as-Sharqiyyeh
Busr al-Harir (2)
Gharriyya al-Gharbiyyeh (2)
Jizzah
Khirbet Ghazaleh
Taiba

**Idlib**
Armanaz
Binnish (2)
Haysh
Idlib
## Appendix 2: Types of Explosive Submunitions and Cluster Munitions in Syria

<table>
<thead>
<tr>
<th>Submunition Type</th>
<th>Submunition Image</th>
<th>Cluster Munition Remnant Image</th>
<th>Notes</th>
</tr>
</thead>
</table>
| AO-1SCh delivered by RBK-250-275 bomb | ![Image](image1.png) | ![Image](image2.png) | • Antipersonnel fragmentation  
• 150 submunitions per bomb  
• Fuze: AMA, AMB  
• 51 grams explosive weight |
| PTAB-2.5M delivered by RBK250-bomb | ![Image](image3.png) | ![Image](image4.png) | • High explosive/anti-tank  
• 30 submunitions per bomb  
• Fuze: AVM-524M  
• 454 grams explosive weight |
| DPICM delivered by 122mm SAKR rocket | ![Image](image5.png) | ![Image](image6.png) | • Dual purpose: high-explosive anti-tank and fragmentation  
• 72 or 98 submunition per rocket, depending on type  
• Submunition thought to be a copy of the US M77 DPICM |

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<table>
<thead>
<tr>
<th>Submunition Type</th>
<th>Submunition Image</th>
<th>Cluster Munition Remnant Image</th>
<th>Notes</th>
</tr>
</thead>
</table>
| AO-2.5RT         | ![AO-2.5RT Image](image1.png) | None Available                | • Antipersonnel fragmentation  
• 108 submunitions per bomb, paired in 54 assemblies or up to 96 per KMG-U dispenser  
• Fuze: Impact  
• 525 grams explosive weight |
| ShOAB-2.5 presumably delivered by RBK-500 ShOAB-2.5 bomb | ![ShOAB-2.5 Image](image2.png) | None Available | • Antipersonnel fragmentation  
• 565 submunitions per bomb |
| PTAB-2.5Ko       | ![PTAB-2.5Ko Image](image3.png) | None Available | • Dual purpose: high-explosive anti-tank and fragmentation  
• Up to 96 per KMG-U dispenser  
• Fuze: Impact and 7-10 second self-destruct |
| 9N235 delivered by 9M55K 300mm rocket | ![9N235 Image](image4.png) | ![9M55K Image](image5.png) | • Antipersonnel fragmentation  
• 72 submunitions per rocket  
• Fuze: Impact and 120 second self-destruct  
• 272 grams explosive weight |

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Submunition Type | Submunition Image | Cluster Munition Remnant Image | Notes
---|---|---|---
Undocumented submunitions 9M27K-series 220mm rocket | None Available | ![Image of submunition](image1.jpg) | • To date, only remnants of 220mm rockets have been documented. The type of submunition delivered by it is not known.

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Sources for Appendix 2:


