

Empty cartridges litter the ground next to government soldiers convening near Ajdabiya, Libya, March 2011. © Ahmed Jadallah/Reuters



Across Conflict Zones

AMMUNITION PROFILING

INTRODUCTION

In early 2012, the Small Arms Survey documented the presence in Libya of crates of 7.62 × 51 mm ammunition produced in Pakistan in 1981 (Jenzen-Jones, 2013a, pp. 22–23). While materiel produced more than 30 years ago would not normally raise questions about possible arms embargo violations, the Pakistani cartridges stood out in Libya, where most of the ammunition of this calibre was produced in Belgium (pp. 40–41). Furthermore, the packaging indicated that the Qatar Armed Forces were the intended recipient. The UN Panel of Experts monitoring the arms embargo on Libya found additional samples of this ammunition and approached Pakistani authorities, who confirmed that the Pakistan Ordnance Factories had shipped several million rounds of 7.62 × 51 mm ammunition to Qatar from 1981 to 1982 and concluded that ‘some of that materiel must have been re-exported to Libya in violation of obligations contained in the end-user certificate signed by Qatar’ (UN, 2013a, para. 69). This example demonstrates how profiling ammunition in circulation in particular countries can help distinguish what is common from what is unusual, and thus worthy of further examination. In this case, such data collection assisted in the investigation of possible arms embargo violations.

Investigators, researchers, war reporters, and activists are increasingly documenting ammunition found in or transferred to areas that are experiencing armed conflict. Photographs of ammunition markings and packaging taken on location, as well as shipping documents retrieved from various sources, provide a wealth of information on the countries and dates of manufacture of war materiel. In some cases, these efforts also allow ammunition to be traced back to the initial recipient as well as to subsequent intermediaries.

Highlighting the important contribution such efforts make to arms trafficking research, this chapter undertakes a meta-analysis of the characteristics of small-calibre ammunition—that is, of calibres of less than 20 mm—documented since 2010 in seven countries and territories: Côte d’Ivoire, Libya, Somalia, Somaliland, South Sudan, Sudan, and Syria. The study draws on samples of ammunition documented during past and ongoing field research by the Small Arms Survey, reports by UN panels of experts and peacekeeping missions, photographs taken by war journalists, and data shared by other partners and researchers. Pulling together this information into a single data set of 560 samples, the chapter analyses the diverse types of ammunition circulating across the seven case studies. In doing so, it aims to:

- establish a general profile of the types of ammunition in circulation in areas affected by conflict, with a particular focus on the calibre, as well as the country and date of manufacture, of the documented cartridges; and
- explore what these profiles can reveal about the production, procurement, and transfer of ammunition.

The chapter’s key findings include:

- Facilities located in 39 countries produced the surveyed ammunition. Production plants located in China and the Soviet Union (now the Russian Federation) account for the greatest share—a combined 37 per cent—of the ammunition samples. The prevalence of cartridges of Sudanese and Iranian manufacture is also noteworthy.

- More than three-quarters of the ammunition samples were Eastern Bloc-calibre cartridges, and more than half were produced during the cold war—highlighting the role of old ammunition in fuelling armed conflict and underlining the importance of reducing stockpile surpluses.
- The presence of newly produced ammunition in several countries illustrates how quickly this materiel can be diverted or retransferred to situations of armed conflict. A total of 29 samples of ammunition observed in Côte d'Ivoire, Somalia, South Sudan, Sudan, and Syria were produced since 2010, for the most part in facilities located in China and Sudan.
- The presence of different types of unmarked cartridges in all but one of the countries and territories under review raises new hurdles for arms monitoring efforts. Markings on certain packaging points to Ethiopia as the manufacturer of some of this ammunition, but in the other cases it is difficult to identify producers conclusively.
- By revealing the presence of specific types of ammunition, several country profiles in this study provide the first evidence of clandestine or destabilizing transfers.

It is important to note that the producing countries identified in this chapter are not necessarily responsible for transferring the ammunition to the conflict environments and actors under study. Indeed, producers may have exported the ammunition legally to these or other countries before it was retransferred without their knowledge and used in conflict, or diverted to non-state armed groups or illicit markets. Information on producers is nevertheless important in generating a baseline of the ammunition in circulation, which in turn may facilitate the identification of unusual or new ammunition flows over time and across borders. Moreover, identifying producers is often a necessary first step in establishing the full chain of custody of ammunition transfers to areas affected by conflict.

This chapter has three sections. The first section presents the data sources and methodology for compiling information on small-calibre ammunition for this study. The second section establishes generic ammunition profiles for the whole data set and for the seven countries and territories under review, focusing on calibre, date, and country of manufacture. The last section provides in-depth information and analysis of instances where the same types of ammunition—some of which bear no markings—were found in multiple locations.

DATA COLLECTION AND METHODOLOGY

This section explains the data sources and methods used to identify, record, and analyse ammunition in the seven countries and territories under review. After providing a general overview of the complementary sources used by researchers to document small-calibre ammunition in conflict and post-conflict areas, it presents the data and methodology used for this chapter.

Documenting ammunition in conflict environments

In situations of armed conflict, it is as important to document ammunition as it is to record weapons. In places where weapons proliferation is widespread, armed actors are often especially concerned about securing their supplies of ammunition. Furthermore, weapons and ammunition are often transferred together. Ammunition identification can also provide information on the types of weapons in circulation (Leff and LeBrun, 2014, p. 13). Lastly, newly manufactured ammunition can also point to recent supply, even when the relevant weapons have been in circulation for decades.



Following an attack in the southwest of Côte d'Ivoire, a soldier stands next to a pile of ammunition, Saho, June 2012. © Issouf Sanogo/AFP Photo

Researchers, investigators, and war reporters have produced a growing body of information on the characteristics of ammunition circulating in conflict situations. This trend has become especially discernible in the last ten years, as toolkits have been developed to promote and guide the precise recording of and reporting on ammunition observed in the field.¹ By combining photographic evidence and contextual information on ammunition retrieved in conflict zones, this type of data collection has made it possible to compare the years and countries of manufacture as well as the physical characteristics of cartridges held by different armed actors. Developing and comparing 'profiles' of ammunition in the hands of various actors helps illustrate possible flows of ammunition between these actors—be they the result of trade, theft, or capture. One of the early studies uses ammunition profiles to expose the transfer of materiel between state security forces and Turkana pastoralist communities in Kenya (Bevan, 2008b, p. 18). A study in Rio de Janeiro, Brazil, shows that gangs were able to access restricted-use assault rifle ammunition held primarily by the police (Bevan and Dreyfus, 2007, p. 310).

The study of ammunition has progressively been integrated into important arms monitoring processes, including the work of panels of experts investigating compliance with UN Security Council arms embargoes, as well as multi-year research projects, such as the Survey's Human Security Baseline Assessment for Sudan and South Sudan (HSBA). Former members of UN panels of experts have also worked together to document the presence of Iranian-manufactured ammunition in several African countries (Conflict Armament Research, 2012). A handful of journalists covering conflict

zones are also reporting on ammunition with increased precision and frequency. Most prominently, C. J. Chivers, a senior writer at *The New York Times*, documents, reports, and shares information on cartridges held by or seized from armed groups in locations such as Afghanistan, Libya, and Syria (Chivers, n.d.).

Researchers and journalists reporting on ammunition rely primarily on field-based investigation, interviews, and physical examination of ammunition in conflict environments. Yet the emergence of online networks of researchers, journalists, and activists covering particular conflicts, or tracking weapons and ammunition generally, has helped to increase the speed at which photographic evidence is shared and analysed, and to raise awareness among a wider group of journalists and activists about the value and importance of recording and documenting ammunition in the field. These trends have resulted in a more diverse set of sources on which analysts can rely, with social networking platforms facilitating information exchange and verification between a broader range of actors.

Data sources

Journalists report on ammunition found in conflict zones with increased precision.

This chapter draws on the diverse set of sources described above to compare small-calibre ammunition samples documented since 2010 in seven countries and territories: Côte d'Ivoire, Libya, Somalia, Somaliland, South Sudan, Sudan, and Syria (see Map 6.1). While data collection methods varied slightly depending on the case study, as described below, each ammunition sample is documented by primary evidence—in most cases photographic records of cartridges, photos of packaging, field observation, and, in a handful of cases, shipping documentation. Overall, 560 ammunition samples totalling millions of cartridges are reviewed across the seven case studies (see Table 6.1).

In this chapter, a 'sample' refers to a specific type of ammunition, characterized in most cases by a unique combination of calibre, year of manufacture, and production facility. As such, this unit of analysis does not infer quantities, although the dataset contains available information about the size of each sample of a specific type of ammunition. Samples range from a handful of cartridges documented from a combatant's magazine and larger stockpiles stored in crates, to spent cartridges collected on the battlefield. If the same variety of ammunition was documented several times in the same country or territory, it is considered part of a single sample within that case study. The same type of ammunition may appear in more than one of the countries or territories under study, however, as discussed below.²

Côte d'Ivoire

This case study includes 246 different samples of ammunition that the Integrated Embargo Monitoring Unit of the UN Operation in Côte d'Ivoire (UNOCI) documented between November 2011 and May 2013 (Anders, 2014, p. 5).³ This period follows the disputed 2010 presidential election, after which forces loyal to opposition leader Alassane Ouattara launched a military offensive and dislodged incumbent Laurent Gbagbo in April 2011. As part of its Security Council mandate, UNOCI examined equipment and took photographs of ammunition and of its packaging during inspections of national defence and security installations, of the disarmament of former combatants and civilians, and of the recovery of ammunition from arms caches and sites of armed attacks. Sample sizes vary greatly, ranging from a few cartridges held by fighters to crates of thousands of units of the same ammunition.

Libya

Data for Libya includes 81 different ammunition samples compiled as part of the Survey's Security Assessment in North Africa project in Jenzen-Jones (2013a; 2013c). Sources for this case study include information and photographs that have been gathered by Survey staff and consultants, journalists—notably Damien Spleeters—other researchers, and organizations working in Libya during and in the aftermath of the 2011 armed conflict. Source material includes

photos—of cartridge headstamps, cartridges, and ammunition packaging—as well as shipping documents pertaining to small-calibre ammunition transfers. Most photographs were taken in Tripoli during the first five months of 2012, with additional photos from Ajdabiya, Bani Walid, Benghazi, Misrata, Mizdah, Sebha, Zawiya, and western Libya between 2011 and 2013 (Jenzen-Jones, 2013a, p. 12; 2013c, p. 1). The ammunition samples were primarily sourced from armed group members and civilians, or found on the battlefield and in looted state storage facilities. The documented samples ranged in size from a few cartridges to transfer records concerning more than a million units.

Somalia and Somaliland

Data for Somalia and Somaliland includes 39 and 29 different ammunition samples, respectively. Data collectors took photographs of and recorded information on ammunition sold by arms dealers and in possession of civilians in Mogadishu, Somalia, and Burao, Somaliland, between April and November 2013. As a result of more than two decades of war and relative statelessness in Somalia, arms and ammunition have moved freely into and within the country. Until recently, arms and ammunition could be purchased without restriction at the Bakaara market, an open-air arms market in the centre of Mogadishu. In contrast, the semi-autonomous state of Somaliland has been relatively peaceful since it declared independence in 1991. However, Somaliland remains a crucial region for the delivery, transshipment, and sale of weapons. The town of Burao, in particular, has one of the most thriving arms markets in Somaliland. The information was gathered as part of the Survey's ongoing monitoring of these illicit arms markets.⁴ Samples were typically small, ranging from a handful to a few hundred cartridges.

South Sudan and Sudan

The chapter reviews 36 ammunition samples from South Sudan and 61 from Sudan, as documented by the Survey's HSBA project between 2010 and 2013. HSBA personnel and consultants with specific expertise in weapons and ammunition identification and tracing undertook the data gathering (Leff and LeBrun, 2014; WEAPONS TRACING); published and unpublished findings from the UN Panel of Experts monitoring the arms embargo on Darfur supplemented the data collection.⁵ In South Sudan, the documented ammunition was found in the hands of non-state armed groups operating in Jonglei, Unity, and Upper Nile states. In Sudan, the samples were observed mainly in the hands of armed groups in the Darfur region, and in Blue Nile and South Kordofan states. In both countries, sample size varied from a handful to several thousand cartridges.

Most of the ammunition documented in South Sudan and Sudan derives from diversion from Sudan Armed Forces (SAF) stockpiles. Sudan supplies insurgent groups in South Sudan with ammunition, apparently in order to fuel opposition to the Juba government. Rebel groups operating in Sudan now procure most of their ammunition through battlefield capture from SAF (Leff and LeBrun, 2014, pp. 59–60).

Syria

Data for Syria includes 68 different samples of ammunition compiled as part of the Survey's Security Assessment in North Africa project in Jenzen-Jones (2014, p. 3). The sources include information and photographs gathered by journalists—in particular C. J. Chivers and Damien Spleeters—researchers, and organizations, as well as some open-source material. The photographs were taken primarily in the Idlib and Aleppo governorates, with images from ad-Dana, al-Bab, Aleppo, Atimah, Bab al-Hawa, Deir Sonbul, Ibleen, Idlib, Jabal al-Zawiya, Kafr Nabl, and Taftanaz. Most of the photographs were taken from March 2012 to May 2013, in the midst of the Syrian armed conflict. Ammunition samples were recovered from both non-state armed groups and government forces, as well as from battlefields, where

Rebel groups in Sudan procure most of their ammunition through battlefield capture.



Free Syrian Army fighters clean their weapons and check ammunition at their base on the outskirts of Aleppo, November 2012. © Khalil Hamra/AP Photo



it may not be possible to determine the affiliation of the shooters.

In all seven case studies, sample ammunition was found in situations of active armed conflict or enduring post-conflict insecurity, either on the battlefield, in both secured and unsecured stockpiles, or in the hands of gunmen and local dealers. While regular government forces held some of the documented samples, the research shows that non-state armed groups in many conflict zones relied on the capture of government materiel for much of their small-calibre ammunition.

Methodology and caveats

International experts in ammunition identification analysed all the photographs and documentation assembled as part of the case studies for the specific purpose of identifying three main features of the ammunition, namely its calibre, production facility (from which the country of production is determined), and year of manufacture. In order to do so, the analysts reviewed a number of characteristics visible on the cartridges, including the markings applied on the ammunition headstamp or its packaging, as well as other physical characteristics of the cartridges (see Jorian and Regenstreif, 1995; Box 6.1). This information was then entered in a single data set, which served as the basis for producing the profiles presented below.

In total, 560 samples of ammunition were included in the data set (see Table 6.1). To ensure consistency between the case studies while enhancing the level of accuracy, recognized ammunition experts cross-checked the entire data set and standardized associated terminology. Although experts made every effort to identify countries of manufacture,

Box 6.1 Identification of small-calibre ammunition

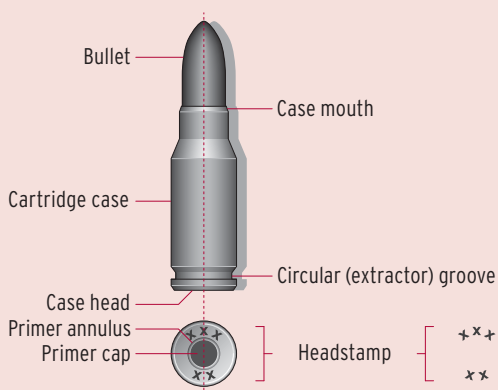
The identification of small-calibre ammunition relies on a variety of components and characteristics (see Figure 6.1). These include:

General characteristics. Different types of cartridges are produced to fulfil different functions. They include ball, soft-point, hollow-point, tracer, incendiary, armour-piercing, and grenade-propelling cartridges, as well as training blanks.

Calibre. Although there are exceptions, the calibre designation of a cartridge is typically determined by measuring the projectile's diameter and the length of the cartridge case—measured from the case head to the case mouth for small-calibre ammunition.

Case type. Cartridges have distinct case types, including rimmed, semi-rimmed, rimless, and belted cases. Most of these can be identified visually, although it can be difficult to differentiate among some varieties.

Figure 6.1 Components of a small-calibre cartridge



Case composition. The type of material used in a cartridge case can provide an indication of the factory or country of production. Case materials include brass, copper-clad steel, coated or lacquered steel, aluminium, plastic, and nicked brass. Brass and copper-clad steel are the most common cartridge case materials.

Headstamp. Cartridges typically feature alphanumeric characters and/or symbols on the case head, which are known as headstamps. These headstamps can provide valuable information about the country of origin, producer, year of production, calibre, and type of cartridge. Exceptionally, they may contain additional information, such as a lot or batch number.

Coloration and markings. Cartridges are marked and coloured in a variety of ways, generally to indicate type or purpose. Occasionally, markings denote a particular brand of ammunition.

Packaging and documentation. Packaging generally consists of outer packaging, such as wooden shipping crates, and inner packaging such as metal tins. Occasionally, smaller units of ammunition may be enclosed in cardboard or plastic packaging. Packaging can provide valuable clues as to the origin, place of production, type, and destination of the ammunition. It may also feature contract numbers, and provide clues as to ports of transit, dates of transfer, and other important information. Documentation, where present, can also provide a wealth of valuable information on the origin, quantities, dates, and ports of shipment involved in an ammunition transfer. In some cases, these documents reference intermediary parties or countries of origin other than the country of original manufacture.

Sources: figure: Bevan (2008a, p. 3 of the 'Ammunition Tracing Manual' section); text: Jenzen-Jones (2013b, pp. 44-50)

they were unable to interpret the markings on a small number of cartridge cases and, in some cases, faced the complete absence of markings, as discussed below. It is also worth noting that cartridges marked with a specific country code and date of production may in fact have been assembled in a country and at a date distinct from those indicated on the headstamp. This is because headstamp markings may refer to the cartridge case and not necessarily the fully assembled cartridge.

The difficulties inherent in documenting conflict ammunition translate into a number of analytical limitations and potential biases in the data set under review. As previously noted, the unit of analysis—samples—refers to specific types of ammunition and not quantities. Sample size ranges from a single cartridge to several hundreds of thousands. As a result, while one country may have produced a large number of the observed samples of ammunition, these may be small in size and add up to relatively few cartridges. In contrast, one country may have manufactured a single sample of ammunition comprising tens of thousands of identical rounds contained in several crates. Quantifying conflict ammunition is nearly impossible, however, as conflict actors may quickly consume it and constantly need to replenish their

stock. The chapter does not pretend to measure quantities of ammunition but seeks to advance knowledge on the main types of ammunition circulating in these areas, supplemented with available information on the quantities involved in relative terms, as available.

The focus of the research was not fully homogenous across the seven countries and territories. Research in South Sudan and Sudan, for instance, focused exclusively on materiel in the hands of non-state armed groups, while data collection in Somalia was centred on ammunition sold at illicit arms markets and in the hands of civilians. In Libya, one data collector homed in on materiel manufactured in Belgium, which allowed for particularly extensive coverage of ammunition produced in that country. Despite these differences, all the encountered types of ammunition were included in the data set. As a result, this chapter offers a strong—and so far unique—basis for analysing ammunition circulating in conflict and post-conflict environments.

AMMUNITION IN CONFLICT: A GENERAL PROFILE

This section presents and compares the general ammunition profiles for the seven countries and territories under review, using calibre, date, and country of manufacture as the key elements of each profile. The section then focuses on the most recently manufactured cartridges, illustrating how the profile of this new ammunition tends to differ from that of the whole data set.

Most of the ammunition samples under review are of Eastern Bloc calibres.

Calibre

Ammunition documented in the seven case studies has 23 different calibres, the distribution of which is presented in Table 6.1. More than three-quarters of the ammunition samples are of Eastern Bloc calibres. In all seven case studies, 7.62×39 mm ammunition is the most prominent calibre, accounting for almost half of all the identified samples. The abundance of 7.62×39 mm samples is not surprising as these cartridges are used with several weapons common to the countries and territories under study, including a variety of Kalashnikov-pattern assault rifles, as well as RPD- and RPK-pattern light machine guns. Other prominent Eastern Bloc calibres include $7.62 \times 54R$ mm ammunition for use in general-purpose machine guns (such as the PK and PKM and their variants) or rifles (such as the Dragunov or Mosin-Nagant), and 12.7×108 mm ammunition for heavy machine guns (such as the DShK and its variants) and anti-materiel rifles (such as the OSV-96).

The most common NATO calibres in the data set are 7.62×51 mm, for use with automatic rifles such as the FAL or G3, and 5.56×45 mm, compatible with AR-15-pattern and FAMAS assault rifles. While Eastern Bloc calibres feature prominently in all seven case studies, NATO calibres were mainly seen in Côte d'Ivoire and Libya, two countries with a history of ammunition imports from Western countries. France was the main provider of ammunition for Côte d'Ivoire until the 1990s (Anders, 2014, p. 6); Belgium was an important supplier of arms and ammunition for Libya in the 1970s and 1980s as well as in 2008–09 (Jenzen-Jones, 2013a, p. 30; annexe 2; Spleeters, 2013, p. 1; annexes 1–2).

While a large variety of Soviet and NATO calibres are available in Côte d'Ivoire and Libya, the other case studies showed less diversity. The data set includes only four different calibres (Eastern Bloc or NATO standard) in South Sudan and five in Sudan, most likely because, as previously explained, the research there focused on cartridges held by non-state actors who obtain most of their ammunition from a single source—SAF—through battlefield capture or diversion. Only a few calibres were documented in Somalia and Somaliland, primarily because Somalia has been subject to an arms embargo for more than 20 years and its suppliers have tended to deal in a limited range of weapons, mostly of Eastern Bloc standard.

Table 6.1 Number of ammunition samples, by case study and calibre

	Côte d'Ivoire	Libya	Somalia	Somaliland	South Sudan	Sudan	Syria	Total
7.62 x 39 mm	109	17	27	15	18	26	46	258
7.62 x 54R mm	22	9	6	3	14	17	7	78
12.7 x 108 mm	11	6	0	0	3	14	4	38
7.62 x 51 mm	10	16	1	4	0	3	3	37
5.56 x 45 mm	25	3	0	0	1	1	0	30
14.5 x 114 mm	18	9	0	0	0	0	1	28
9 x 19 mm	18	6	0	0	0	0	0	24
7.62 x 25 mm	7	0	4	7	0	0	1	19
7.5 x 54 mm	14	0	0	0	0	0	0	14
12.7 x 99 mm	9	2	0	0	0	0	0	11
12-gauge	0	4	0	0	0	0	2	6
5.45 x 39 mm	3	0	0	0	0	0	1	4
5.7 x 28 mm	0	2	0	0	0	0	0	2
9 x 18 mm	0	1	1	0	0	0	0	2
Other	0	6	0	0	0	0	3	9
Total	246	81	39	29	36	61	68	560

Note: Samples in this chapter refer to specific types of ammunition—generally characterized by a unique combination of calibre, year of manufacture, and production facility—and do not infer actual quantities.

Table 6.2 Ammunition samples, by year of manufacture (as percentages)

	Côte d'Ivoire	Libya	Somalia	Somaliland	South Sudan	Sudan	Syria	Total
Before 1950	2	1	3	10	0	0	0	2
1950-59	15	0	8	10	0	5	1	8
1960-69	14	5	8	7	0	0	1	8
1970-79	18	35	23	48	31	15	6	21
1980-89	16	26	5	10	6	5	19	15
1990-99	15	2	10	3	3	10	18	11
Since 2000	16	14	38	0	56	64	46	28
n/a	4	17	5	10	6	2	9	7
Total	100	100	100	100	100	100	100	100

Notes: Totals do not always add up to 100 due to rounding. Samples in this chapter refer to specific types of ammunition—generally characterized by a unique combination of calibre, year of manufacture, and production facility—and do not infer actual quantities.

Year of manufacture

With the exception of a 6.5 × 52 mm Carcano cartridge produced in 1936 and found in Libya, all ammunition samples were manufactured after World War II, between 1946 and 2012. Significantly, more than half (54 per cent) of the identified ammunition samples were produced before 1990 (see Table 6.2). The presence of such a variety of older ammunition demonstrates the extended lifetime of small-calibre ammunition, its potential use in conflicts decades after its date of manufacture, and the possibility of a long chain of custody involving several transfers. Ammunition produced during the cold war features more prominently in some of the countries and territories under review, accounting for all but three of the samples documented in Somaliland and about two-thirds of those seen in Côte d'Ivoire and Libya.

Almost 30 per cent of the ammunition samples in all countries were produced after 2000, pointing to recent supply. This ammunition appears to be particularly prominent in Sudan, accounting for almost two-thirds of the documented samples, as well as—to a lesser extent—in South Sudan, Syria, and Somalia (56, 46, and 38 per cent of cases, respectively).

Country of manufacture

The ammunition samples originated in facilities located in 39 countries. Table 6.3 shows the main producing countries for each case study as well as for the entire data set. Overall, factories located in China and the former Soviet Union (in territory that is now the Russian Federation) manufactured the largest share of the samples under review (19 and 18 per cent, respectively). These two countries were the producers of the largest proportion of samples in all of the case studies under review, with the exception of Libya, where the greatest share of documented ammunition samples originated in Belgium.

While this list of producers comprises mainly countries of the former Eastern Bloc, China, as well as several NATO members, a handful of countries from Africa, and some Middle Eastern states, are also identified. These include Algeria, Egypt, Iran, Israel, Sudan, Syria, Turkey, Uganda, and Zimbabwe. Among the samples, Iranian- and Sudanese-produced ammunition seem most widespread geographically, as they are found in four and five of the seven case studies, respectively. Iranian- and Sudanese-produced cartridges were found in Côte d'Ivoire, South Sudan, Sudan, and Syria—and Sudanese ammunition was also found in Somalia.⁶ This finding is consistent with a growing body of evidence showing the presence of Iranian and Sudanese arms and ammunition in multiple countries in Africa (Conflict Armament Research, 2012; Leff and LeBrun, 2014, pp. 44–55). It is also important to note that Sudan and Syria produce their own ammunition, samples of which are documented in the data set. Syrian ammunition was not found outside of Syria, however.

As noted above, the producing countries reported in Table 6.3 did not necessarily transfer ammunition directly to the seven countries and territories under study. A careful examination of authorized ammunition transfers data can reveal instructive correspondences between documented producers and reported exporters, however. France, for instance, reported regular transfers of ammunition to Côte d'Ivoire between 1978 and 1990, in which some of the ammunition samples documented in this chapter and dating from the same time period might have originated. Similarly, some of the recently produced Chinese ammunition found in Sudan may have been transferred as part of China's export of USD 535,500 worth of small arms ammunition that Sudan reported in 2007 (NISAT, n.d.). Iran reported transfers of small arms ammunition to Syria amounting to more than USD 2 million in 1999 and 2000, which may explain the presence of Iranian ammunition produced in 1999 in the Syria case study.

Iranian- and Sudanese-produced ammunition circulates in multiple countries in Africa.

That said, the overlap between producer and exporter data is of little utility for determining the source of the ammunition documented in this chapter. States are under no obligation to report to existing arms transfer databases. Some countries do so on a voluntary basis, while others fail to report part or all of the transfers they authorize.⁷ Moreover, states that report their exports may be exporting ammunition produced in other countries. As a result, the correspondence

Table 6.3 Ammunition samples, by country of manufacture (as percentages)

Côte d'Ivoire		Libya		Somalia		Somaliland	
Soviet Union (now Russian Federation)	27	Belgium	26	China	31	Soviet Union (now Russian Federation)	31
France	15	Soviet Union (now Russian Federation)	15	Soviet Union (now Russian Federation)	13	Bulgaria	14
China	7	China	11	Soviet Union (now Ukraine)	13	Hungary	7
Soviet Union (now Kyrgyzstan)	6	Romania	9	Bulgaria	8	Russian Federation	7
Soviet Union (now Ukraine)	6	Russian Federation	5	Sudan	8	Albania	3
Bulgaria	4	Czechoslovakia (now Czech Republic)	4	Uganda	8	China	3
South Africa	4	Bulgaria	2	Russian Federation	5	Czechoslovakia (now Czech Republic)	3
Sudan	4	Italy	2	Algeria	3	Egypt	3
Iran	3	Hungary	2	Poland	3	German Democratic Republic (now Germany)	3
Israel	3	Portugal	2	Federal Republic of Yugoslavia	3	North Korea (presumed)	3
Other	18	Other	15	Other	3	Other	14
n/a	2	n/a	6	n/a	5	n/a	7
Total	100	Total	100	Total	100	Total	100

Notes: Totals do not always add up to 100 due to rounding. Samples in this chapter refer to specific types of ammunition—generally characterized by a unique combination of calibre, year of manufacture, and production facility—and do not infer actual quantities.

Open-source databases of authorized small arms transfers indicate that the producing countries in darker grey cells exported ammunition to the countries under consideration at some point between 1962 and 2012 (NISAT, n.d.). Only transfers of a value exceeding USD 10,000, and for which NISAT ranked the sources as highly reliable, were retained in the analysis. The reviewed data includes UN Comtrade

between a reported transfer and a documented ammunition sample, highlighted in a darker grey in Table 6.3, does not necessarily show the direct supply of the case study country by the producing country. In fact, the many ammunition samples that bear no correspondence with authorized trade data underline the lack of such a correlation, emphasizing the need for in-depth research to determine the origins of ammunition found in conflict environments (WEAPONS TRACING).

South Sudan		Sudan		Syria		Total	
China	44	China	56	China	24	China	19
Sudan	22	Sudan	23	Iran or Syria	12	Soviet Union (now Russian Federation)	18
Soviet Union (now Kyrgyzstan)	8	Iran	10	Soviet Union (now Russian Federation)	9	Sudan	7
Bulgaria	6	Israel	3	Syria	9	France	7
Soviet Union (now Ukraine)	6	Soviet Union (now Kyrgyzstan)	3	Sudan	7	Belgium	4
Czechoslovakia (now Czech Republic)	3	Soviet Union (now Russian Federation)	2	Syria (presumed)	6	Bulgaria	4
Iran	3	Soviet Union (now Ukraine)	2	Iran	4	Soviet Union (now Kyrgyzstan)	4
Soviet Union (now Russian Federation)	3	.		Romania	4	Soviet Union (now Ukraine)	4
.		.		Russian Federation	4	Iran	3
.		.		Czechoslovakia (now Czech Republic)	3	Romania	3
Other	0	Other	0	Other	15	Other	24
n/a	6	n/a	2	n/a	3	n/a	3
Total	100	Total	100	Total	100	Total	100

categories 930630 (small arms ammunition) and 930621 (shotgun cartridges), EU category ML3 (ammunition and fuze setting devices, and specially designed components), and small arms ammunition transfers as reported in states' national reports.

The lighter grey cell indicates that, although Belgium did not report these transfers to the above databases, Belgian government and FN Herstal documents published by the Survey show that Belgium exported small arms ammunition to Libya in the 1970s, 1980s, as well as in 2008 and 2009 (Jenzen-Jones, 2013a, annexe 2; Spleeters, 2013, annexe 1).

Box 6.2 Unpacking ammunition supplies: a case study of ammunition packaging in South Sudan and Sudan

Ammunition packaging is powerful evidence that can provide clues as to the origin, factory of production, type, and destination of the enclosed ammunition. It may also reveal information pertaining to the date of transfer and the total quantity of a certain consignment, which helps arms monitors to extrapolate the size of national ammunition stockpiles.⁹ This information is often marked on the exterior of the packaging, which generally consists of outer packaging, most often wooden shipping crates, and inner packaging, such as metal tins. In some instances, smaller units of ammunition may be contained in cardboard or plastic packaging inside the shipping crate.

Since ammunition headstamps found in conflict zones often reveal little more than the production facility and year of manufacture, extensive research must be carried out and large data sets created to draw definite conclusions about the chain of custody of any single item or combination of ammunition types. Packaging, on the other hand, may include information on the intended recipient. If this information is missing, arms monitors can sometimes use alternative details, such as unique lot numbers on the packaging, to identify the recipient. If manufacturing states refuse to divulge information on their arms exports, the cross-referencing of similar or identical packaging may prove informative—as illustrated by the following case from Sudan and South Sudan.

In May 2012, the Small Arms Survey documented weapons in South Kordofan state, Sudan. The rebel group Sudan People's Liberation Movement-North (SPLM-N) had captured them from the Sudan Armed Forces during battle earlier that year. Among the cache of weapons were five crates of Chinese-manufactured 7.62 x 54R mm ammunition (see Figure 6.2). Although it was not possible to inspect the contents of the boxes, which were sealed, the construction

of the box and markings on the exterior of the packaging, in particular the contract number ('10XSD14E0128STC/SD'), appeared to indicate that in 2010 ('10') the Xinshidai ('XSD')⁹ company of China had signed a contract for the delivery of the ammunition to the Sudan Technical Center ('STC') in Sudan ('SD'). This shipment appears to have been part of a consignment of 6,998 cases—each containing 1,000 rounds and totalling nearly 7 million rounds—of 7.62 x 54R mm ammunition that China supplied to Sudan after 2010.¹⁰

On a weapons tracing mission in September 2012, the Small Arms Survey documented weapons that the South Sudan Democratic Movement/Army (SSDM/A), a Khartoum-backed rebel group, had handed over to the Sudan People's Liberation Army (SPLA), South Sudan's military, following a peace deal with the Juba government. Among the weapons was one box of 7.62 x 54R mm ammunition with the same contract and total case numbers (see Figure 6.3). This time, the Survey was able to open the crate to inspect the contents. Inside the wooden box were two metal tins, each containing 500 rounds of a commonly observed variety of Chinese-manufactured factory 945 7.62 x 54R mm ammunition, produced in 2010.

Whereas the documentation of one or even 1,000 headstamps of a single type of ammunition can reveal something about the types of ammunition being supplied to a particular country or armed actor, a single crate of ammunition can bring to light something about much larger-scale consignments. When ammunition is delivered to illegal arms markets, brokers and dealers often transport the ammunition in sacks or other types of discreet packaging to conceal it. As a result, original ammunition packaging is unusual to come by in arms bazaars. As noted here, in cases of deliberate supply from state to non-state armed groups, packaging can serve as an important source of information.

Figure 6.2 Ammunition crates held by the SPLM-N, South Kordofan, Sudan, May 2012



© Claudio Gramizzi/Small Arms Survey

Figure 6.3 Ammunition crate and headstamp of the 7.62 x 54R mm cartridges it contained, handed over by the SSDM/A to the SPLA in early 2012, South Sudan, September 2012



© Jonah Leff/Small Arms Survey

Ammunition produced since 2000

The data set includes 156 samples of ammunition identified as having been manufactured since 2000. Examining ammunition of recent manufacture is valuable in that the time between production and the moment the ammunition was found in a conflict environment is relatively short. As a result, it is generally easier, with additional research and documentation, such as packaging information (see Box 6.2), to determine proximate sources and chains of custody than it is for older ammunition, whose ownership may have changed a number of times before finding its way to an armed conflict.

Comparing the profile of the whole data set with that of ammunition produced since 2000 yields some interesting insights. The post-1999 subset comprises only eight types of calibres, compared with 23 for the whole data set. Eastern Bloc calibres dominate the post-1999 subset even more than the overall sample, with 7.62 × 39 mm, 7.62 × 54R mm, and 12.7 × 108 mm samples representing 90 per cent of the subset (see Table 6.4). NATO calibre ammunition represents only 7 per cent of the samples identified as having been manufactured after 1999. This finding suggests a growing demand for Eastern Bloc calibres in recent years; it also accords with increasing proportions of Eastern Bloc weapons in the countries and territories under study.¹¹

China dominates the list of producing countries for ammunition manufactured since 2000, with Chinese factories identified as the producers for 37 per cent of these samples (see Table 6.5). In fact, recently manufactured Chinese ammunition was documented in all of the countries and territories under review, barring Somaliland. Sudanese ammunition was also widespread, accounting for 24 per cent of the samples of recent ammunition and found in all of the countries and territories save Libya and Somaliland. Iranian ammunition accounted for about 9 per cent of these samples and was found in four of the seven case studies.¹² Another 14 countries produced the remaining samples, but, overall, China and Sudan stand out as having produced the great majority of the recently manufactured samples of ammunition documented here. As discussed below, Chinese samples tend to involve larger quantities of cartridges than the Sudanese samples.

Table 6.4 Number of ammunition samples manufactured since 2000, by calibre

	Côte d'Ivoire	Libya	Somalia	South Sudan	Sudan	Syria	Total
7.62 x 39 mm	22	6	11	7	14	27	87
7.62 x 54R mm	10	0	3	9	10	3	35
12.7 x 108 mm	3	0	0	3	11	1	18
5.56 x 45 mm	4	2	0	1	1	0	8
7.62 x 51 mm	0	0	0	0	3	0	3
5.7 x 28 mm	0	2	0	0	0	0	2
14.5 x 114 mm	1	1	0	0	0	0	2
9 x 18 mm	0	0	1	0	0	0	1
Total	40	11	15	20	39	31	156

Notes: No cartridges with an identified production date in or after 2000 were documented in Somaliland. Samples in this chapter refer to specific types of ammunition—generally characterized by a unique combination of calibre, year of manufacture, and production facility—and do not infer actual quantities.
















Table 6.5 Number of samples of ammunition manufactured since 2000, by country of manufacture

	Côte d'Ivoire	Libya	Somalia	South Sudan	Sudan	Syria	Total
China	7	3	7	11	21	8	57
Sudan	10	0	3	8	12	5	38
Iran	7	0	0	1	4	2	14
Iran or Syria	0	0	0	0	0	8	8
Israel	3	0	0	0	2	0	5
Russian Federation	0	4	1	0	0	0	5
Romania	3	0	0	0	0	1	4
Belgium	0	3	0	0	0	0	3
Bulgaria	3	0	0	0	0	0	3
Serbia	3	0	0	0	0	0	3
Syria (presumed)	0	0	0	0	0	3	3
Uganda	0	0	3	0	0	0	3
Czech Republic	2	0	0	0	0	0	2
Algeria	0	0	1	0	0	0	1
Bangladesh	1	0	0	0	0	0	1
Iran (presumed)	0	0	0	0	0	1	1
Kyrgyzstan	0	0	0	0	0	1	1
Spain	0	1	0	0	0	0	1
Syria	0	0	0	0	0	1	1
Ukraine	0	0	0	0	0	1	1
n/a	1	0	0	0	0	0	1
Total	40	11	15	20	39	31	156

Notes: No cartridges with an identified production date in or after 2000 were documented in Somaliland. Samples in this chapter refer to specific types of ammunition—generally characterized by a unique combination of calibre, year of manufacture, and production facility—and do not infer actual quantities.

A closer look at the 29 ammunition samples produced in 2010, 2011, and 2012—meaning at most two years before they were found in the conflict environments under review—suggests the growing presence of Sudanese- and Chinese-manufactured ammunition (see Table 6.6).¹³ The Military Industry Corporation (MIC) in Khartoum produced 12 of these samples. Chinese-produced cartridges also make up 12 samples, with Iranian, Romanian, Russian, and Ukrainian samples—as well as one attributed to either Iran or Syria—completing the list. Most ammunition samples produced during this period were of 7.62 × 39 mm, 7.62 × 54R mm, and 12.7 × 108 mm calibre. This data shows how little time need pass between the production of ammunition and its entry into conflict zones.

Table 6.6 Spotlight on ammunition samples produced since 2010

Calibre	Country where documented	Headstamp information	Year of production	Country of manufacture	Production facility	Headstamp photo
7.62 x 39 mm	Syria	1_39_012	2012	Sudan	Military Industry Corporation (MIC), Khartoum	 © C.J. Chivers (The New York Times)
7.62 x 39 mm	Syria	1_39_12	2012	Sudan	MIC, Khartoum	 © C.J. Chivers (The New York Times)
7.62 x 39 mm	Syria	7.62 x 39_12	2012	Romania	Unidentified	 © C.J. Chivers (The New York Times)
7.62 x 39 mm	Côte d'Ivoire	1_39_011	2011	Sudan	MIC, Khartoum	 © Holger Anders/UNOCI
7.62 x 54R mm	Côte d'Ivoire	1_54_011	2011	Sudan	MIC, Khartoum	 © Holger Anders/UNOCI
7.62 x 54R mm	South Sudan	2_54_011	2011	Sudan	MIC, Khartoum	 © Small Arms Survey
7.62 x 54R mm	South Sudan	3_54_011	2011	Sudan	MIC, Khartoum	 © Small Arms Survey
7.62 x 39 mm	South Sudan	61_11	2011	China	Unidentified	 © Small Arms Survey
7.62 x 54R mm	South Sudan	945_11	2011	China	Unidentified	 © Small Arms Survey
7.62 x 39 mm	Sudan	2_39_011	2011	Sudan	MIC, Khartoum	 © Small Arms Survey
7.62 x 39 mm	Syria	2_39_011	2011	Sudan	MIC, Khartoum	 © C.J. Chivers (The New York Times)
7.62 x 39 mm	Syria	7.62 x 39_7_11	2011	Iran	Defense Industries Organization	 © C.J. Chivers (The New York Times)
7.62 x 39 mm	Syria	811_11	2011	China	Unidentified	 © C.J. Chivers (The New York Times)
7.62 x 54R mm	Syria	945_11	2011	China	Unidentified	 © C.J. Chivers (The New York Times)
7.62 x 39 mm	Côte d'Ivoire	1_39_10	2010	Sudan	MIC, Khartoum	 © Holger Anders/UNOCI

Calibre	Country where documented	Headstamp information	Year of production	Country of manufacture	Production facility	Headstamp photo
12.7 x 108 mm	Côte d'Ivoire	41_10	2010	China	Unidentified	 © Holger Anders/UNOCI
7.62 x 39 mm	Somalia	1_39_10	2010	Sudan	MIC, Khartoum	 © Small Arms Survey
9 x 18 mm	Somalia	LVE_10_9mm Makarov	2010	Russian Federation	Novosibirsk Cartridge Plant, Novosibirsk	 © Small Arms Survey
7.62 x 39 mm	South Sudan	1_39_10	2010	Sudan	MIC, Khartoum	 © Small Arms Survey
12.7 x 108 mm	South Sudan	11_10	2010	China	Mudanjiang North Alloy Tool, Mudanjiang	 © Small Arms Survey
12.7 x 108 mm	South Sudan	41_10	2010	China	Unidentified	 © Small Arms Survey
7.62 x 54R mm	South Sudan	945_10	2010	China	Unidentified	 © Small Arms Survey
12.7 x 108 mm	Sudan	11_10	2010	China	Mudanjiang North Alloy Tool, Mudanjiang	 © Small Arms Survey
12.7 x 108 mm	Sudan	41_10	2010	China	Unidentified	 © Small Arms Survey
7.62 x 54R mm	Sudan	945_10	2010	China	Unidentified	 © Small Arms Survey
7.62 x 39 mm	Syria	1_39_10	2010	Sudan	MIC, Khartoum	 © C. J. Chivers (The New York Times)
12.7 x 108 mm	Syria	41_10	2010	China	Unidentified	 © C. J. Chivers (The New York Times)
7.62 x 39 mm	Syria	7.62 x 39_7_2010_7	2010	Iran or Syria	Unidentified	 © C. J. Chivers (The New York Times)
7.62 x 39 mm	Syria	LCW_10_7.62 x 39	2010	Ukraine	Lugansk Cartridge Works, Lugansk	 © Damien Spleeters

Notes: Samples in this chapter refer to specific types of ammunition—generally characterized by a unique combination of calibre, year of manufacture, and production facility—and do not infer actual quantities.

AMMUNITION WITHOUT BORDERS

This section reviews available information on types of ammunition documented in multiple locations, relying on the reporting of data collectors as well as background information shared by a network of arms monitors (see Map 6.1). Overall, there was relatively little overlap in the types of ammunition headstamps found across the case studies, with only six cartridge types found in three or more of the countries and territories under review (see Table 6.7). While more field research is needed to fully interpret this finding, it may indicate limited circulation of ammunition between the conflict zones under review.

Map 6.1 Selected ammunition found in case study countries and territories

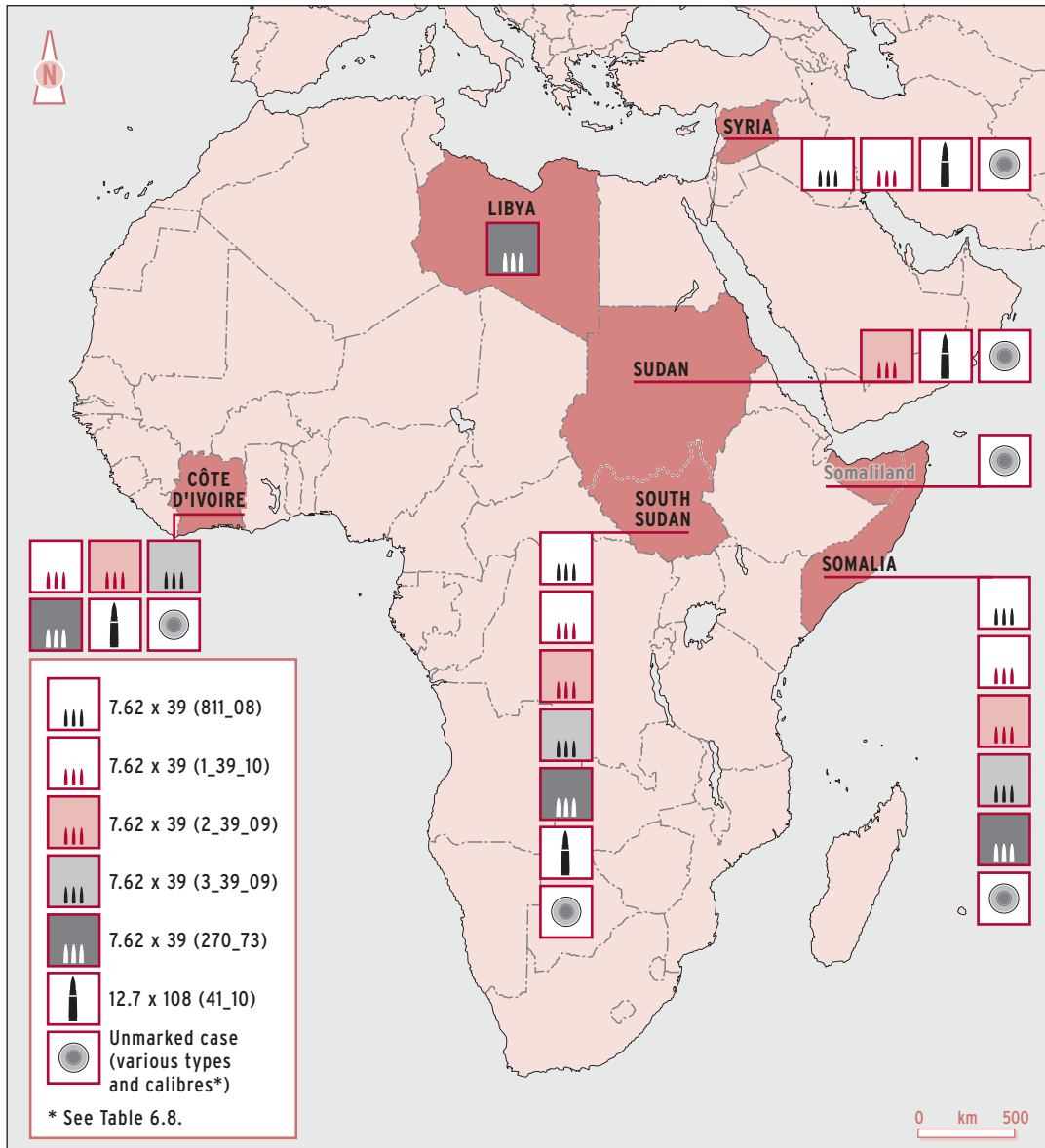















Table 6.7 Specific ammunition headstamps found in three or more countries in the study

Country of manufacture	Headstamp information	Year of production	Production facility	Calibre	Countries where documented	Headstamp photos
China	811_08	2008	Unidentified Chinese manufacturer	7.62 x 39 mm	Somalia	 © Small Arms Survey
					South Sudan	 © Small Arms Survey
					Syria	 © C. J. Chivers (The New York Times)
	41_10	2010	Unidentified Chinese manufacturer	12.7 x 108 mm	Côte d'Ivoire	 © Holger Anders/UNOCI
					South Sudan	 © Small Arms Survey
					Sudan	 © Small Arms Survey
Syria					 © C. J. Chivers (The New York Times)	
Sudan	1_39_10	2010	Military Industry Corporation (MIC), Khartoum	7.62 x 39 mm	Côte d'Ivoire	 © Holger Anders/UNOCI
					Somalia	 © Small Arms Survey
					South Sudan	 © Small Arms Survey
					Syria	 © C. J. Chivers (The New York Times)
	2_39_09	2009	MIC, Khartoum	7.62 x 39 mm	Côte d'Ivoire	 © Holger Anders/UNOCI
					Somalia	 © Small Arms Survey

Country of manufacture	Headstamp information	Year of production	Production facility	Calibre	Countries where documented	Headstamp photos
				7.62 x 39 mm	South Sudan	 © Small Arms Survey
					Sudan	 © Small Arms Survey
					Côte d'Ivoire	 © Holger Anders/UNOCI
					Somalia	 © Small Arms Survey
					South Sudan	 © Small Arms Survey
Soviet Union (now Ukraine)	270_73	1973	Lugansk Cartridge Works, Lugansk	7.62 x 39 mm	Côte d'Ivoire	 © Holger Anders/UNOCI
					Libya	 © Damien Spleeters
					Somalia	 © Small Arms Survey
					South Sudan	 © Small Arms Survey

The overlap that does exist across the seven countries and territories is nevertheless revealing and confirms some of the major patterns discussed above. Four types of cartridge—two of Sudanese manufacture, one Chinese, and one Ukrainian—were found in four of the seven countries and territories under review. Another two types of ammunition produced in China and Sudan appeared in three of the case studies. Interestingly, five of these six types of ammunition were produced in 2008 or later, illustrating the proliferation of some varieties of recently manufactured ammunition across conflict areas. In addition, several types of unmarked cartridges of 7.62 × 39 mm, 7.62 × 54R mm, and 7.62 × 51 mm calibre were found in six of the seven countries and territories (see Table 6.8). While some packaging suggests that certain types of unmarked ammunition were manufactured in Ethiopia, little information is available on the origins of the other unmarked ammunition. The rest of this section analyses the circumstances surrounding some of these samples, revealing a number of ammunition transfer and diversion patterns.

Chinese ammunition

China is one of the world's most significant exporters of small arms, and data for the period 2006–10 suggests that African states account for the largest share of reported imports of Chinese military small arms (Bromley, Duchâtel, and Holtom, 2013, pp. vi, vii, 43). While African states are the recipients of these reported transfers, Chinese small arms ammunition has also been observed with various non-state armed groups on the continent, presumably as a result of diversion, theft, or capture from the recipient states' arsenals.¹⁴ As noted above, Chinese ammunition represents the largest share (37 per cent) of all recently manufactured samples of ammunition in the data set and was documented in all the countries and territories under review.

African states are the main importers of Chinese military small arms.

The most common Chinese sample in the data set is 12.7 × 108 mm ammunition marked '41_10' and produced in 2010. This variety was documented in four states: Côte d'Ivoire, South Sudan, Sudan, and Syria. The largest quantity of '41_10' ammunition was observed with the rebel group Sudan People's Liberation Movement–North (SPLM–N) in South Kordofan and Blue Nile states, Sudan. The SPLM–N acquires the bulk of its weapons from SAF through battlefield capture. Small Arms Survey researchers documented about 2,000 rounds of '41_10' ammunition with fighters in South Kordofan and about 500 rounds with the SPLM–N in Blue Nile in May and December 2012, respectively.¹⁵ In both cases, the ammunition was contained in Sudanese packaging similar to that described below, probably indicating that it had been repackaged after import (Leff and LeBrun, 2014, p. 32). Prior to this research, in May 2011, investigators had documented 50 rounds of the same ammunition alongside matching Sudanese crates at a SAF military camp in East Darfur, Sudan.¹⁶

Identical ammunition is also present in South Sudan. When the Khartoum-backed South Sudan Liberation Movement/Army (SSLM/A) accepted an amnesty in April 2013, they crossed from South Kordofan, Sudan, into Unity state, South Sudan, where, in May, the Small Arms Survey viewed their weapons. Among vast quantities of military equipment were about 500 cartridges of '41_10' ammunition. Unlike the samples in Sudan, however, these were contained in Chinese packaging (Leff and LeBrun, 2014, p. 32). In addition, in South Sudan's Unity state in May 2012, the Survey documented dozens of Chinese '41_10' cartridges with the Justice and Equality Movement, which had captured the supply from SAF in February 2012.¹⁷

Chinese '41_10' 12.7 × 108 mm ammunition was also documented in Côte d'Ivoire in 2011–13 and in Aleppo, Syria, in December 2012. In both cases the sample sizes and users are unclear.

Although not included in the chapter data set, '41_10' ammunition was also previously documented in Somalia. In 2010 and 2011, peacekeepers of the African Union Mission in Somalia (AMISOM) were the sole supplier of ammunition to the beleaguered Somali Transitional Federal Government (TFG). A 2011 report by the UN Somalia and Eritrea Monitoring Group (UN SEMG) states that several sources, including members of the Somali military itself, held that the Somali army sold off one-third to one-half of its ammunition stockpiles. The UN SEMG likewise found 'a strong correlation between the ammunition issued to TFG and pro-TFG militia, ammunition sold in Bakaara market, and ammunition confiscated from Al-Shabaab' (UN, 2011b, p. 231). AMISOM supplied large quantities of '41_10' ammunition to the TFG in 2010 and 2011.

According to the UN SEMG, 41_10 ammunition constituted about 90 per cent of all 12.7 × 108 mm ammunition being sold at the Bakaara market at that time (UN, 2011b, pp. 232–33). Since this ammunition was produced in 2010, only a number of months before it was documented, it is improbable that it would have reached Mogadishu through traditional trafficking channels in such a short period of time. Interviews with several current and former arms dealers in Mogadishu further indicated that the majority of their ammunition, in particular that which was recently manufactured,

had been sold to them by Somali forces.¹⁸ Although it is difficult to verify the exact chain of custody of this ammunition, particularly that in the hands of Al Shabaab,¹⁹ it appears plausible that it is, at least in part, the same ammunition that AMISOM transferred to the Somali armed forces.

Chinese-produced Factory 811 7.62 × 39 mm ammunition dated 2008 ('811_08') appeared in Somalia, South Sudan, and Syria. It was the most common ammunition among the 15 types that the UN SEMG documented in Mogadishu between January and April 2011. Not only were tens of thousands of rounds observed at the Bakaara market, but the type was also identified in four separate seizures of ammunition from Al Shabaab, totalling around 1,000 cartridges (UN, 2011b, p. 231). Between May and November 2013, the Small Arms Survey documented '811_08' ammunition with arms dealers in Mogadishu, Somalia, on five separate occasions, totalling more than 1,500 cartridges.

The same type of ammunition was also observed with the South Sudan Democratic Movement/Army (SSDM/A), a Khartoum-backed armed insurgent group led by George Athor in Jonglei state, South Sudan. In early 2011, his forces repeatedly clashed with the Sudan People's Liberation Army (SPLA) in the aftermath of elections in which he was defeated while running for governor of Jonglei state. Among the large quantities of weapons that the SPLA captured from the SSDM/A were several rounds of '811_08' ammunition.²⁰ In May 2013, war journalist C. J. Chivers documented one '811_08' cartridge that was with an opposition commander in Idlib, Syria.²¹



An Ethiopian police officer in plain clothes overlooks weapons and ammunition seized from Bakaara market as part of a security crackdown, Mogadishu, July 2007. © Mohamed Sheikh Nor/AP Photo

Although these '811_08' cartridges are not included in the data set, investigators also claim to have observed this ammunition in the following contexts:

- with government forces in the Democratic Republic of the Congo (DRC) in 2013;²²
- used by a non-state armed group in an attack against UN peacekeepers in East Darfur in July 2013;²³
- in various locations in Niger and Mali in 2013 (UN, 2014, p. 88);²⁴ and
- at the site of a gun battle between Seleka and anti-balaka combatants in Bossangoa, Central African Republic, where Peter Bouckaert of Human Rights Watch retrieved 17 cartridges on 5 December 2013.²⁵

Figure 6.4 Sudanese packaging for 7.62 x 39 mm ammunition, Côte d'Ivoire, 2013



Sudanese ammunition

Sudan has manufactured small arms ammunition at least since the 1950s (HSBA, 2011, p. 1). Although Sudan's Military Industry Corporation says it produces a full range of small arms ammunition,²⁶ the Small Arms Survey has documented only Sudanese-manufactured 7.62 × 39 mm, 7.62 × 51 mm, and 7.62 × 54R mm in the countries and territories under review.²⁷ Sudanese ammunition characteristically bears three- and four-entry headstamp codes, though the Survey's data set primarily includes three-entry cartridges, which are of more recent manufacture than four-entry varieties. Sudan's three-entry headstamp codes are unique in that it appears that the first digit—ordinarily a '1', '2', or '3'—indicates the batch number of the cartridge case production run, the second number the case length, and the third the year of manufacture (Bevan, 2012; HSBA, 2011).

The most common Sudanese-manufactured ammunition recorded in the countries and territories under review was a 7.62 × 39 mm round with the headstamp '1_39_10' with '1' probably denoting the batch, '39' the case length, and '10' the year of manufacture (2010). This type of ammunition was documented, in varying quantities, in Côte d'Ivoire, Somalia, South Sudan, and Syria. The case of Côte d'Ivoire is particularly striking. Sudan reportedly supplied these rounds to the Gbagbo government, with large quantities later diverted to rebels and ultimately civilians in early 2011 (Anders, 2014, pp. 8–9).²⁸ Tens of thousands of rounds of this ammunition were observed in their original Sudanese packaging, which is distinguishable by its rudimentary construction; a small white label featuring the boxes' contents, dimensions, and date of packaging; and 15 black polyethylene bags, each holding 100 rounds contained inside the box (see Figure 6.4).

Between 2011 and 2013, the Survey also observed large quantities of this ammunition with Khartoum-backed South Sudanese insurgent groups. For example, South Sudan's military, the SPLA, captured more

than 150 Chinese-manufactured Type 56-1 assault rifles (similar in construction to various Kalashnikov assault rifles with a folding metal stock) from forces of the SSLM/A in Unity state, South Sudan, in early 2011. The rifles were loaded with a single variety of '1_39_10' 7.62 × 39 mm ammunition, totalling about 4,000 rounds. Subsequently, the Survey documented the same type of ammunition, but in much smaller quantities, with the Khartoum-backed SSDM/A and the South Sudan Defence Forces (SSDF) in Jonglei state, South Sudan, in February 2011 and September 2012, respectively (Leff and LeBrun, 2014, p. 46–47).

Identical cartridges have also appeared in conflicts in Somalia and Syria. In May 2013, for instance, C.J. Chivers documented a handful of '1_39_10' rounds with the Soqour al-Sham rebel group in Idlib, Syria.²⁹ In August 2013, *The New York Times* reported that Sudan had supplied weapons to rebels in Syria via Turkey with Qatari support (Chivers and Schmitt, 2013). The Survey has been unable to verify whether this ammunition was delivered as part of the consignment of weapons. Only one month later, the Survey documented eight rounds of '1_39_10' ammunition with an arms dealer in Mogadishu, where it was being sold for USD 0.90 per unit. While the UN reported that Sudan supplied a consignment of medium-calibre arms and ammunition to the then Somali TFG in 2010, it remains unclear whether the Sudanese '1_39_10' ammunition seen in Somalia was part of such a direct transfer (Leff and LeBrun, 2014, p. 46; UN, 2013b, p. 289).

A similar type of Sudanese ammunition bearing the headstamp code '2_39_09' has also appeared in Côte d'Ivoire, Somalia, South Sudan, and Sudan. Unlike the '1_39_10' variety, all of the documented '2_39_09' headstamps were poorly marked (see Figure 6.5).³⁰ In late 2013, large quantities of '2_39_09' began appearing in arms markets in Mogadishu. In July–November, the Survey recorded it with arms dealers on multiple occasions, and in one instance, as described above, documented it with its original Sudanese packaging. Likewise, in 2011, the Survey observed this ammunition among equipment that the SPLA captured from the SSLM/A in Unity state, South Sudan, where it was not possible to photograph it. The Survey also documented a number of '2_39_09' rounds with the SSDF in September 2012 and once with the SSLM/A in May 2013.

A third type of ammunition of the same variety—'3_39_09'—was observed in Côte d'Ivoire, Somalia, and South Sudan. The UN first identified it with pro-Gbagbo forces in Côte d'Ivoire in November 2011. Nearly one year later, the Survey documented a handful of identical rounds with the SSDF in South Sudan. Most recently, in September–November 2013, the Survey recorded more than 400 rounds of '3_39_09' ammunition with arms dealers in Mogadishu (Leff and LeBrun, 2014, p. 47).³¹

Although three-entry Sudanese headstamps are most common in the data set, researchers identified 7.62 × 39 mm rounds with a four-entry headstamp ('SU_1_39_01') in several countries. In this case, 'SU' denotes the country of manufacture (Sudan), '1' possibly the lot number, '39' the case length, and '01' the year of manufacture (HSBA, 2011, p. 5). One sample of this type was collected at the site of an attack on a UN peacekeeping convoy in South Darfur in February 2010. The identity of the perpetrators is unclear.³² UN monitors documented hundreds of the same type of ammunition in the framework of voluntary weapons and ammunition collection programmes in Côte d'Ivoire (Anders, 2014, p. 9).³³ The rounds were recovered without any packaging. According to another weapons researcher, the same ammunition

Figure 6.5 Sudanese-manufactured 7.62 x 39 mm ammunition that the SPLA seized from the SSLM/A, South Sudan, 2011



was observed in 2009 with Mai Mai armed groups and the Forces Républicaines Fédéralistes in the DRC, yet it is not included in the data set.³⁴

Ukrainian ammunition

Ukraine is one of several former Eastern Bloc states that sold off large quantities of surplus weapons and ammunition, largely as a result of military downsizing (Gobinet and Gramizzi, 2011, p. 2; Griffiths and Karp, 2010, p. 213).³⁵ Among the older varieties in the data set, former Soviet/Ukrainian 7.62 × 39 mm ammunition from the Lugansk Cartridge Works with factory code 270 and produced in 1973 ('270_73') appears particularly common.³⁶ This ammunition can be distinguished from other types not only because of its production date, but also because it circulates in four of the conflict areas under review: Côte d'Ivoire, Libya, Somalia, and South Sudan.

Unmarked ammunition was uncovered in six of the seven countries and territories under review.

Ammunition marked '270_73' is readily available in Mogadishu. In June 2013, the Survey documented 200 cartridges of '270_73' ammunition with an arms dealer who was charging USD 0.90 per round. The following month, two separate civilians showed the Survey 170 and 15 '270_73' cartridges, respectively, that they had purchased in Mogadishu. In 2011, the UN SEMG documented large quantities of '270_73' ammunition at the Bakaara market as well as with Al Shabaab, although it did not see any with AMISOM forces (UN, 2011b, p. 231).³⁷

In addition to the thousands of rounds of Sudanese-manufactured 7.62 × 39 mm ammunition that the SPLA captured from the SSLM/A in Unity state, South Sudan, in 2011, the SPLA seized at least one dozen Ukrainian rounds with headstamp '270_73'. It is not clear whether this ammunition was supplied by an external source or whether it belonged to SPLA stockpiles that SSLM/A forces took with them when they defected from the SPLA.³⁸

In February 2012 war journalist Damien Spleeters documented a '270_73' cartridge in Tripoli, Libya. It was observed at the site where the loyalist Khamis brigade orchestrated a massacre in August 2011, yet it is not clear who the user was.³⁹ UNOCI documented about 100 '270_73' cartridges in several locations in Côte d'Ivoire in 2012–13, mainly in the context of arms collection programmes for civilians and former combatants, as well as with government forces.⁴⁰

In 2006–08, the Survey recorded '270_73' ammunition with pastoralists in Kenya, Sudan, and Uganda, yet this type is not included in the data set. In 2013, an investigator observed the same ammunition in Tunisia.⁴¹










Unmarked ammunition

While the vast majority of ammunition bears markings that provide some information on its origins, Survey research has uncovered several examples of unmarked ammunition—meaning that no information was stamped onto the head of the cartridge, where a headstamp would normally appear—in six of the seven countries and territories under review (see Table 6.8). It is not immediately clear if manufacturers produce unmarked ammunition to conceal its origin or because of a lack of oversight or interest. In any case, the resulting lack of information makes arms monitoring more difficult. Although the Small Arms Survey and associated experts have not been able to identify the origin of several types of unmarked ammunition in the data set, information inscribed on packing slips points to Ethiopia as one of the producers.

Unmarked 7.62 x 39 mm ammunition

The data set includes similar samples of unmarked 7.62 × 39 mm ammunition that were observed in Somalia, South Sudan, and Sudan. Common characteristics include a brass case and red sealant at the primer annulus, which appear to be from the same factory. The ammunition has a flat-bottom bullet rather than a more common boat-tail bullet, and

Table 6.8 Case head photos and key characteristics of samples of unmarked ammunition

Ammunition characteristics	Calibre	Country or territory where documented	Case head photos
Brass cartridge case and red primer sealant	7.62 x 39 mm	Somalia	 © Small Arms Survey
		South Sudan	 © Small Arms Survey
		Sudan	 © Small Arms Survey
Copper-clad steel cartridge case with unevenly applied red primer sealant and yellow neck sealant	7.62 x 54R mm	Côte d'Ivoire	 © Holger Anders/UNOCI
		South Sudan	 © Small Arms Survey
Brass cartridge case and red primer sealant	7.62 x 54R mm	Somalia	 © Small Arms Survey
		South Sudan	 © Small Arms Survey
Brass cartridge case and red primer sealant	7.62 x 51 mm	Somaliland	 © Small Arms Survey
Brass cartridge case with green primer sealant and three-square-stake primer crimp	7.62 x 51 mm	Syria	 © C.J. Chivers (The New York Times)

is Berdan-primed brass.⁴² Twenty cartridges are contained in white cardboard inner packaging with blue/purple ink marks. Similar outer packaging—dark green crates (see Figure 6.6)—was found in both South Sudan and Sudan.⁴³ The outer packaging found in Sudan appears identical to that found with unmarked 7.62 × 54R mm ammunition in Somalia, which also featured packing slips from the Homicho Ammunition Engineering Industry (HAEI) company in Ethiopia (see Figure 6.7).⁴⁴ As of January 2014, the HAEI website listed South Sudan and Sudan among its foreign clients (HAEI, n.d.). For these reasons, it appears likely that HAEI also manufactured the unmarked 7.62 × 39 mm ammunition documented in South Sudan and Sudan.

The Survey first documented about 100 rounds of this unmarked 7.62 × 39 mm ammunition in April 2011 among a cache of weapons that the SPLA had seized from the rebel group SSDM/A, which operated under the leadership of George Athor in Jonglei state, South Sudan. One year later in South Kordofan, Sudan, the Survey recorded 1,300 similar rounds in their original packaging, dated 2003, with the SPLM-N, which claimed to have captured the ammunition

Figure 6.6 **Box of unmarked 7.62 x 39 mm ammunition in South Kordofan, Sudan, May 2012**

© Claudio Gramizzi/Small Arms Survey

from SAF. Then, in September 2012, the Survey observed 1,300 rounds of the same ammunition in identical packaging dated 2001 that the SPLA had collected from the SSDM/A in Jonglei state, South Sudan. Two months later, the same ammunition, though in loose form, was observed in Blue Nile, Sudan, once again with SPLM-N troops, who, like their comrades in South Kordofan, claimed to have seized it from SAF. The SPLM-N in Blue Nile also had several boxes identical to those documented in South Kordofan and Jonglei in their possession, but claimed that they were part of their ammunition stockpile, rather than materiel captured from SAF. In July 2013, the Survey documented hundreds of rounds among weapons that the SPLA had seized from the SSDM/A under the leadership of David Yau Yau in Jonglei state, South Sudan. Lastly, the Survey documented four similar unmarked 7.62 × 39 mm cartridges in May 2013 with an arms dealer in Mogadishu, Somalia; in July of the same year, the Survey recorded 50 cartridges with a civilian residing in Mogadishu (Leff and LeBrun, 2014, pp. 65–66).⁴⁵

Unmarked 7.62 x 54R mm ammunition

The data set includes three types of unmarked 7.62 × 54R mm ammunition. The Survey documented 45 rounds of 7.62 × 54R mm ammunition with brass cartridge cases and red primer sealant in the possession of an arms dealer in Mogadishu, Somalia, in May 2013. The same ammunition was again observed in Mogadishu in early 2014; this time researchers documented dozens of green boxes with the unmarked ammunition inside white cardboard boxes (20 cartridges per box) that appear identical to those containing the abovementioned unmarked 7.62 × 39 mm ammunition in South Sudan and Sudan.⁴⁶ On the boxes were packing slips identifying the manufacturer as HAEI in Ethiopia (see Figure 6.7).

In July 2013, the Survey observed hundreds of rounds of 7.62 × 54R mm ammunition that the SPLA had captured from Yau Yau's SSDM/A forces in Jonglei, South Sudan. The brass case and red primer sealant of these cartridges appear slightly different from the cartridges found in Somalia, and this ammunition's origin remains unknown.

A third type of unmarked 7.62 × 54R mm ammunition is composed of a copper-clad steel case with unevenly applied red primer sealant and yellow neck sealant.⁴⁷ It was observed in both Côte d'Ivoire and South Sudan. Survey researchers saw about 200 rounds of this unmarked ammunition in a box of Sudanese manufacture contained in black polyethylene bags (similar to the Sudanese 7.62 × 39 mm packaging seen in Figure 6.4) during the same April 2011 inspection of weapons that the SPLA had seized from the SSDM/A in Jonglei state, South Sudan, described above.⁴⁸ Between May and September 2013, UN monitors documented hundreds of these unmarked 7.62 × 54R mm cartridges in Côte d'Ivoire, alongside Sudanese ammunition, and some inside Sudanese packaging (Anders, 2014, p. 36).⁴⁹ Due to the circumstances in which this ammunition has appeared in both Côte d'Ivoire and South Sudan, as well as technical considerations, including their Sudanese packaging and distinctive neck and primer sealants, it appears possible that this type of unmarked 7.62 × 54R mm ammunition is Sudanese-manufactured (Anders, 2014; Leff and LeBrun, 2014).⁵⁰

Unmarked 7.62 x 51 mm ammunition

Although NATO-standard unmarked 7.62 × 51 mm ammunition is not as common as 7.62 × 39 or 7.62 × 54R mm unmarked ammunition, the Survey has documented it in Somaliland, with brass cases and red primer sealant similar to those of the 7.62 × 39 rounds described above. In November 2013, the Survey documented several rounds of this ammunition with an arms dealer in Burao. Further, a 7.62 × 51 mm unmarked case head was documented in Idlib, Syria, in September 2012, along with its packaging, which indicated that it originally contained 1,000 cartridges. The cartridge appeared to be of brass alloy, with green sealant at the primer annulus and a three-square-stake primer crimp (Jenzen-Jones, 2014, p.13).

Figure 6.7 **Outer packaging, packing slip, and case head of unmarked 7.62 x 54R mm ammunition, Mogadishu, 2014**



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CONCLUSION

This chapter draws from seven country/territory ammunition profiles to generate a deeper understanding of the types of ammunition circulating in recent conflict and post-conflict areas in sub-Saharan Africa, North Africa, and the Middle

East. Of the ammunition samples under review, more than three-quarters were Eastern Bloc-calibre cartridges, and more than half were produced during the cold war. This highlights the role old stockpiles of small-calibre ammunition continue to play in armed conflict and underlines the relevance of efforts to reduce aging surpluses.

Yet this pattern is shifting markedly, as various other types of ammunition now also circulate in conflict-affected environments. Cartridges manufactured since 2000 were available in all the countries and territories under review barring Somaliland.

As many as 29 samples of ammunition were produced after 2009—meaning at most two years before they were found in the surveyed conflict environments. Chinese and Sudanese ammunition constitute the bulk of the samples of this new ammunition. Domestically produced ammunition is also in use in the battlefields of Sudan and Syria. Overall, the data suggests a more diverse profile for conflict ammunition than was previously assumed.

The country/territory profiles also make it possible to identify single types of ammunition that are circulating in multiple locations. While the data set contains only few such cases, they reaffirmed some of the above findings—such as the seemingly increased importance of Chinese and Sudanese ammunition in conflict-affected situations. They also point to broader patterns of ammunition transfer.

The reported involvement of Sudan in transferring arms and ammunition to several of the case study countries—including Côte d'Ivoire, Somalia, South Sudan, and Syria—is an example that highlights the utility of establishing profiles of conflict ammunition. In fact, in several cases, efforts to map and monitor ammunition over time provided the first evidence of clandestine or destabilizing transfers of specific types of cartridges.

While arms monitors have accorded increasing importance to ammunition in recent years, the presence of unmarked cartridges, in several cases of unknown origin, in most of the conflict zones under review raises new hurdles for monitoring work. As the chapter also points out, patchy reporting by states on their authorized transfers severely limits the utility of existing databases and complicates research on the possible provenance of conflict ammunition. More systematic reporting, data collection, and information sharing, as well as the use of more sophisticated ammunition recognition and tracing techniques, will be critical to improving our understanding—and our ability to track—conflict ammunition in the years to come. ■

LIST OF ABBREVIATIONS

AMISOM	African Union Mission in Somalia
DRC	Democratic Republic of the Congo
HAEI	Homicho Ammunition Engineering Industry
HSBA	Human Security Baseline Assessment for Sudan and South Sudan
MIC	Military Industry Corporation
SAF	Sudan Armed Forces
SPLA	Sudan People's Liberation Army
SPLM-N	Sudan People's Liberation Movement-North
SSDF	South Sudan Defence Force
SSDM/A	South Sudan Democratic Movement/Army
SSLM/A	South Sudan Liberation Movement/Army
TFG	Transitional Federal Government
UNOCI	United Nations Operation in Côte d'Ivoire
UN SEMG	United Nations Somalia and Eritrea Monitoring Group

ENDNOTES

- 1 See Bevan (2008a).
- 2 As a result, the totals in the following tables reflect a limited amount of double counting of specific types of ammunition that are found in more than one country.
- 3 Information was supplemented by the findings of the UN Groups of Experts concerning Côte d'Ivoire; see UN (n.d.a).
- 4 In 2013, the Small Arms Survey published a detailed analysis of the prices of arms and ammunition sold at several illicit markets, including in Somalia and Somaliland. See Florquin (2013).
- 5 To view the reports of the Panel of Experts, see UN (n.d.b).
- 6 Although this information was not published in time for inclusion in the chapter data set, the UN Panel of Experts on Libya also documented Sudanese-produced ammunition in Libya 'following armed clashes that took place in November 2013 in Tripoli between Tripoli and Misrata brigades' (UN, 2014, para. 82). The cartridges were marked with '2_39_011' and '1_39_12' headstamps, indicating production in 2011 and 2012 (Figures IV and V).
- 7 For an example of unreported Belgian exports to Libya, see Table 6.3 and the associated note.
- 8 As portions of any one consignment can be retransferred, reliable estimates remain difficult to establish, however.
- 9 In a 2013 report, the UN Group of Experts on Côte d'Ivoire notes that the abbreviation 'XSD' refers to the Xinshidai Company (UN, 2013c, para. 48). See also Bevan (2012, p. 13).
- 10 The contract number on the crate bears the date 2010, which is the year the contract was signed, not necessarily the year that the items were delivered.
- 11 Author correspondence with two weapons researchers, October 2013.
- 12 The proportion of Iranian-manufactured ammunition in the data set is probably higher, as experts were not able to determine conclusively whether eight samples of recently manufactured ammunition were of Iranian or Syrian origin, given the similarities in the characteristics of these two countries' ammunition. See Jenzen-Jones (2014, pp. 6–9).
- 13 A headstamp year indicates the earliest possible date for the assembling of the cartridge. Yet assembly occurs after the case was made and may involve components produced elsewhere, or produced prior to assembly.
- 14 See Leff and LeBrun (2014, pp. 30–35) and UN (2011a, pp. 20–25; 2011b, para. 103, annexe 5.1) for examples of Chinese ammunition in the possession of non-state actors in Africa.
- 15 During the same visit, investigators also documented the possession by the SPLM–N of Factory 41 12.7 × 108 mm ammunition produced in 1991, 2006, and 2007.
- 16 Author correspondence with a weapons researcher, 23 September 2013.
- 17 HSBA inspection of materiel in South Kordofan, Sudan, and Unity state, South Sudan, in May 2012, and in Blue Nile state, Sudan, in December 2012.
- 18 The bulk of other ammunition supplies tends to be shipped from Yemen and usually comprises older varieties. Small Arms Survey interviews with Somali arms dealers, Mogadishu, 2011–13.
- 19 Although Al Shabaab may have relied on several channels for its supply of ammunition, in 2011 it took advantage of the convenience and affordability of the Al Shabaab-controlled Bakaara market. Small Arms Survey interviews with Somali shopkeepers and arms dealers, Mogadishu, 2011–13.
- 20 HSBA inspection of materiel in Jonglei state, South Sudan, 2011.
- 21 Author correspondence with N. R. Jenzen-Jones, September 2013.
- 22 Investigators also documented Factory 811 ammunition produced in 2001, 2006, and 2007. Author correspondence with a former embargo monitor, 23 September 2013.
- 23 Author correspondence with a weapons researcher, 24 September 2013.
- 24 Author correspondence with a weapons researcher, 21 September 2013.
- 25 Author correspondence with Peter Bouckaert, Human Rights Watch, 14 January 2014.
- 26 See MIC (2014).
- 27 MIC's website features 7.62 × 39 mm (Maz) and 7.62 × 54R mm (Mokhtar), but not 7.62 × 51 mm ammunition (MIC, 2014).
- 28 Author correspondence with a weapons researcher, September 2013.
- 29 Author correspondence with C. J. Chivers, September 2013.
- 30 Sudanese-manufactured ammunition is known for the poor quality of its headstamps. Headstamps on ammunition produced in 2009 are especially difficult to decipher.
- 31 HSBA and Small Arms Survey inspections in South Sudan and Mogadishu, September 2012 and September–November 2013, respectively. Although not in the data set, similar varieties of Sudanese ammunition with headstamps '1_39_08', '1_39_07', '2_39_07', and '2_39_06' were documented with M23 rebels in North Kivu, DRC, in late 2013. Author correspondence with a researcher in the DRC, December 2013.

- 32 HSBA interview with a former member of UN Panel of Experts on Sudan, 25 September 2013.
- 33 The UN Group of Experts on Côte d'Ivoire also documented this type of ammunition in its 2009 final report (UN, 2009, p. 33).
- 34 Author correspondence with a weapons researcher, 23 September 2013.
- 35 An estimated 85 per cent of Ukraine's arsenal became obsolete due to these changes (Gobinet and Gramizzi, 2011, p. 2).
- 36 In some cases in Mogadishu, headstamps with '270_73' have included a full stop after the '73' ('73.').
- 37 Author interview with a former member of the UN SEMG, 25 September 2013.
- 38 HSBA inspection of materiel in Unity state, South Sudan, April 2011.
- 39 Author correspondence with Damien Spleeters, 25 September 2013.
- 40 Author correspondence with a weapons researcher, 17 December 2013.
- 41 Author correspondence with a weapons researcher, 21 September 2013.
- 42 The heads of brass cartridges are manufactured with either berdan or boxed primers.
- 43 While the colour of the markings differed—yellow on the crates in Sudan, white in South Sudan—experts believe they originate from the same factory. Given the similar construction and colour of the crates, their contents, and the nature of the information provided by the markings, it appears plausible that the boxes with white markings were simply earlier versions of those with yellow markings. Author correspondence with weapons researchers, February 2014.
- 44 As stated on the HAEI website: 'Established in 1987 as Project 130, the company was designed to build the local manufacturing capacity of ammunition products. In 2010, the company was restructured under the Metals and Engineering Corporation (METEC)' (HAEI, n.d.).
- 45 The 2012 report of the UN SEMG describes a delivery in October 2010 of 7.62 × 39 mm ammunition dated 2001 to the private security company Saracen International Ltd. in Puntland, Somalia. Although not recorded in the chapter data set, this ammunition was observed in packaging that matched that found with the unmarked 7.62 × 39 mm cartridges retrieved in South Sudan—dark green crates with white markings (UN, 2012, p. 257). A weapons researcher also spotted similar types of unmarked 7.62 × 39 mm ammunition in Tunisia, but without its packaging. Author correspondence with a weapons researcher, 21 September 2013.
- 46 Author correspondence with weapons researchers, March 2014.
- 47 Sealant is used to attach the neck of the cartridge to the base side of the bullet.
- 48 HSBA inspection of materiel in Jonglei state, South Sudan, April 2011.
- 49 Author correspondence with a weapons researcher in Côte d'Ivoire, September 2013.
- 50 Author correspondence with a weapons researcher in Côte d'Ivoire, September 2013.

BIBLIOGRAPHY

- Anders, Holger. 2014. *Identifying Sources: Small-calibre Ammunition in Côte d'Ivoire*. Special Report. Abidjan and Geneva: United Nations Operation in Côte d'Ivoire and Small Arms Survey.
- Bevan, James. 2008a. *Ammunition Tracing Kit: Protocols and Procedures for Recording Small-calibre Ammunition*. Geneva: Small Arms Survey. June.
- . 2008b. *Blowback: Kenya's Illicit Ammunition Problem in Turkana North District*. Occasional Paper 22. Geneva: Small Arms Survey. June.
- . 2012. 'Sudan Ammunition.' Unpublished technical paper. London: Conflict Armament Research. 27 September.
- and Pablo Dreyfus. 2007. 'Enemy Within: Ammunition Diversion in Uganda and Brazil.' In *Small Arms Survey. Small Arms Survey 2007: Guns and the City*. Cambridge: Cambridge University Press, pp. 289–315.
- Bromley, Mark, Mathieu Duchâtel, and Paul Holtom. 2013. *China's Exports of Small Arms and Light Weapons*. Policy Paper No. 38. Stockholm: Stockholm Peace Research Institute. October.
- Chivers, C. J. n.d. 'The Gun.' Blog. Accessed December 2013. <<http://cjchivers.com/>>
- and Eric Schmitt. 2013. 'Arms Shipments Seen from Sudan to Syria Rebels.' *The New York Times*. 12 August. <http://www.nytimes.com/2013/08/13/world/africa/arms-shipments-seen-from-sudan-to-syria-rebels.html?pagewanted=all&_r=1&>
- Conflict Armament Research. 2012. *The Distribution of Iranian Ammunition in Africa: Evidence from a Nine-country Investigation*. London: Conflict Armament Research. December. <http://www.conflictarm.com/images/Iranian_Ammunition.pdf>
- Florquin, Nicolas. 2013. 'Price Watch: Arms and Ammunition at Illicit Markets.' In *Small Arms Survey. Small Arms Survey 2013: Everyday Dangers*. Cambridge: Cambridge University Press, pp. 250–81.
- Gobinet, Pierre and Claudio Gramizzi. 2011. *Scraping the Barrel: The Trade in Surplus Ammunition*. Issue Brief No. 2. Geneva: Small Arms Survey.

- Griffiths, Hugh and Aaron Karp. 2010. 'Ukraine: Coping with Post-Soviet Legacies.' In Aaron Karp, ed. *The Politics of Destroying Surplus Small Arms: Inconspicuous Disarmament*. New York: Routledge, pp. 208–33.
- HAEI (Homicho Ammunition Engineering Industry). n.d. Company website. Accessed 23 January 2014.
<<http://www.metec.gov.et/index.php/en/metec-industries/homicho-ammunition-industry>>
- HSBA (Human Security Baseline Assessment). 2011. 'A Guide to Sudanese Ammunition (1954–Present).' Tracing Desk Report. Geneva: Small Arms Survey. 11 November. <<http://www.smallarmsurvey.org/fileadmin/docs/facts-figures/arms-ammunition-tracing-desk/HSBA-Sudanese-ammunition.pdf>>
- Jenzen-Jones, N. R. 2013a. *Following the Headstamp Trail: An Assessment of Small-calibre Ammunition Found in Libya*. Working Paper No. 16. Geneva: Small Arms Survey.
- . 2013b. *The Identification of Small Arms, Light Weapons, and Associated Ammunition: An Introductory Guide*. Unpublished HSBA Training Manual. Geneva: Small Arms Survey.
- . 2013c. *Small-calibre Ammunition in Libya: An Update*. Security Assessment in North Africa Dispatch No. 2. Geneva: Small Arms Survey.
- . 2014. *Known Small-calibre Ammunition in Syria: An Overview*. Geneva: Small Arms Survey.
- Jorian, Serge and Philippe Regenstreif. 1995. *Culots de Munitions Atlas*, Vol. II. Toulouse: Cépaduès-Éditions.
- Leff, Jonah and Emile LeBrun. 2014. *Following the Thread: Tracing Arms and Ammunition in Sudan and South Sudan*. HSBA Working Paper No. 32. Geneva: Small Arms Survey.
- MIC (Military Industry Corporation). 2014. 'Ammunitions.' Company website. Accessed 13 January 2014.
<<http://www.mic.sd/index/en/products/ammunitions>>
- NISAT (Norwegian Initiative on Small Arms Transfers). n.d. 'Small Arms Trade Database' Oslo: NISAT. Accessed 12 February 2014.
<<http://legacy.prio.no/pd/GenericPage.aspx?id=134>>
- Spleeters, Damien. 2013. *FAL Rifles in Libya: A Guide to Data Gathering*. Security Assessment in North Africa Dispatch No. 1. Geneva: Small Arms Survey.
- UN (United Nations). 2009. *Final Report of the Group of Experts on Côte d'Ivoire Pursuant to Paragraph 11 of Security Council Resolution 1842 (2008)*. S/2009/521 of 9 October 2009.
- . 2011a. *Report of the Panel of Experts on the Sudan Established Pursuant to Resolution 1591 (2005)*. S/2011/111 of 8 March 2011.
- . 2011b. *Report of the Monitoring Group on Somalia and Eritrea Submitted in Accordance with Resolution 1916 (2010)*. S/2011/433 of 18 July.
- . 2012. *Report of the Monitoring Group on Somalia and Eritrea Pursuant to Security Council Resolution 2002 (2011)*. S/2012/544 of 13 July.
- . 2013a. *Final Report of the Panel of Experts in Accordance with Paragraph 10(d) of Resolution 2040 (2012)*. S/2013/99 of 15 February.
- . 2013b. *Report of the Monitoring Group on Somalia and Eritrea Pursuant to Security Council Resolution 2060 (2012): Somalia*. S/2013/413 of 12 July.
- . 2013c. *Midterm Report of the Group of Experts Submitted in Accordance with Paragraph 19 of Security Council Resolution 2101 (2013)*. S/2013/605 of 14 October.
- . 2014. *Final Report of the Panel of Experts Established Pursuant to Resolution 1973 (2011) Concerning Libya*. S/2014/106 of 15 February.
- . n.d.a. 'Reports of the Group of Experts Submitted through the Security Council Committee Established Pursuant to Resolution 1572 (2004) Concerning Côte d'Ivoire.' <http://www.un.org/sc/committees/1572/CI_poe_ENG.shtml>
- . n.d.b. 'Reports of the Panel of Experts Submitted through the Security Council Committee Established Pursuant to Resolution 1591 (2005) Concerning the Sudan.' <<http://www.un.org/sc/committees/1591/reports.shtml>>

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