

The epicentre of the blasts at the Mpila munitions depot, in which military barracks and surrounding civilian buildings were destroyed or damaged and at least 300 people killed, 9 March 2012, Brazzaville, Republic of the Congo.
© United Nations Mine Action Team (UNMAT)



Countdown to Catastrophe

THE MPILA AMMUNITION DEPOT EXPLOSIONS

INTRODUCTION

On 4 March 2012, a series of explosions destroyed several military barracks in the Mpila area of Brazzaville, Republic of the Congo (RoC). The blasts devastated two surrounding, densely populated districts of the capital, claiming hundreds of lives, injuring thousands, and displacing well over 100,000 people.

The international community swiftly contributed significant emergency funding and coordinated explosive ordnance disposal (EOD) and humanitarian relief activities with non-governmental organizations (NGOs). The magnitude of the event—particularly its immediate consequences—drew considerable media coverage as well as efforts to tackle the underlying problem of poor stockpile management. Since then, however, national priorities and international donor funding have moved on. The root causes of the explosions have still not been properly addressed, nor have their broad socio-economic consequences been fully remedied.

In January 2013 the Small Arms Survey participated in an evaluation funded by the European Union (EU) and led by the Geneva International Centre for Humanitarian Demining (GICHD). The assessment focused on (i) the effectiveness of the clearance activities, (ii) the coordination between the national authorities and the implementation partners, and (iii) the risk education provided to communities around Mpila concerning the potential danger of unexploded ordnance (UXO). The evaluation team travelled to Brazzaville from 14 to 23 January 2013 and published its report in March 2013 (EU, 2013).

The Survey subsequently sought to complement the findings of the evaluation report, which only addresses UXO clearance and risk education efforts, by focusing on other cross-cutting issues, namely: (i) the long-term ammunition procurement and stockpiling practices that led to the explosions, and (ii) the direct and indirect consequences of the blasts on the city's population, the country's finances, and government policy.

The research used a wide range of mostly internal documents obtained during the initial EU-funded evaluation, including reports from the Forces Armées Congolaises (Congolese Armed Forces, FAC), international organizations, NGOs, and the EOD coordination centre. The Survey complemented these sources with (i) follow-up interviews with a broad range of field actors, (ii) expert background papers, (iii) the United Nations Commodity Trade Statistics Database (UN Comtrade),¹ (iv) Survey research, including the Unplanned Explosions at Munitions Sites (UEMS) project, and (v) other open source and media reports. The Survey also submitted more than 1,700 ammunition photos² to EOD specialist Alex Diehl for identification of ammunition types.

The chapter's main findings are:

- In a matter of minutes, the explosions killed at least 300 people, injured more than 2,500, and left more than 121,000 homeless. The number of dead probably far exceeds 300 since the Ministry of Defence (MoD) did not officially report military fatalities.

- According to ammunition technicians and EOD specialists familiar with the event, inadequate ammunition stockpile management is the root cause of the Mpila ammunition depot explosions.
- The quantity of ammunition originally contained in the depots before the blasts is unknown, yet EOD teams destroyed more than 200 tonnes of UXO—representing more than 39 tonnes in net explosive content—during the subsequent clearance efforts between March 2012 and April 2013.
- The ammunition types destroyed, which were not recent, included a mix of pyrotechnics, small arms ammunition, grenades, mines, large-calibre projectiles, rockets, missiles, and aircraft bombs amassed haphazardly in the Mpila depot's explosive storehouses in the late 1970s and 1980s, during the RoC's internal conflicts in the 1990s, and during subsequent disarmament, demobilization, and reintegration (DDR) programmes.
- The unchecked expansion of the civilian population around an explosive storage area containing such types and quantities of ammunition places more people at higher risk in the case of an explosion.
- The total impact of the explosions was partially estimated—mostly in terms of direct physical damage to the private sector—at more than XAF 336 billion (USD 672 million). Broader economic impacts were significant and long-lasting, with macroeconomic repercussions felt throughout the country.
- The tragedy was preventable. Prior to the explosion, a number of warning signs were ignored by the international donor community or, in the case of the FAC, simply not recognized due to its lack of stockpile management expertise.
- At the time of writing, post-explosion progress in stockpile management practices was slow, indicating a lack of buy-in from RoC authorities, as well as donor fatigue and wariness from potential sponsors.

This chapter begins by looking back. A chronological description of the Mpila ammunition depot explosions—and their root causes—leads to a discussion on the types and quantities of ammunition that were in the depot prior to the explosion, as well as the probable origins of this ordnance. The second section details the impact of the explosions on the local population and infrastructure, government finances, and the country's socio-economic development. The third and final section highlights the opportunities the RoC had to avoid the explosion, the country's multilateral commitments for stockpile management, and future perspectives.

ANATOMY OF AN EXPLOSION

This section provides a chronological description of the Mpila ammunition depot explosions. It discusses the root causes of the explosions, the types and quantities of ammunition that were in the depot before the explosions, and the probable origins of this ordnance.

Chronology of the blasts

The EU-funded evaluation report details the chronology of the emergency efforts, rubble excavation, and clearance operations that followed the Mpila explosions (EU, 2013, annexe 5). This section of the chapter discusses the sequence of the explosions themselves. It draws on interview notes gathered during the assessment team's visit to Brazzaville in January 2013, as well as on an unpublished background paper authored by technical team member John Rawson of the GICHD (Rawson, 2013a–d).

The first explosion occurred between 7:30 a.m. and 8:10 a.m. on Sunday, 4 March 2012. Photographic evidence and witness accounts indicate that this first explosion was not a detonation but a deflagration.³ Since this first explosion was



A plume of smoke billowing over the site of the explosions at the munitions depot in Mpila, Brazzaville, is visible from across the river, 4 March 2012, Kinshasa, Democratic Republic of the Congo. © Marc Hofer/AFP Photo

not accompanied by a blast wave, it drew the local population, which gathered at the scene as though to see a spectacle. Casualties were limited. Around 120 soldiers from the FAC barracks located next to the depot, eventually accompanied by the fire brigade and police, tried to fight the fire and organize evacuation. As the fire persisted, many small items of burning ammunition were probably kicked out, causing smaller fires to burn around them.

Some of the kick-outs from the deflagrating store landed in one or several trailers of ammonium nitrate/fuel oil (ANFO)⁴ that were reportedly parked inside the barracks, as discussed below. Unpublished amateur videos showing people fleeing just before the large blast suggest that it may have been at this point that some began to appreciate the danger and started to move away from the area.

By 8:40 a.m. the fire had transferred enough heat energy to detonate the ANFO, resulting in a high-order explosion. In turn, the latter caused a sympathetic detonation among other stocks of larger high-explosive items located nearby. These included high-explosive fragmentation aircraft bombs, 120 mm mortar rounds, 122 mm (Grad) rockets, and other large-calibre ammunition (see Annexe 5.1). This resulted in a huge explosion with an accompanying blast

wave that flattened buildings up to 1 km around the site, causing the majority of the casualties. While the exact figure is unknown, a large percentage of the military personnel assisting the officer from the Direction générale de l'équipement (General Directorate of Logistics and Equipment, DGE) or fighting the fires were killed or injured in this explosion, along with many civilian bystanders. Some who survived then began to rescue the injured who lay among the rubble, recovering bodies. Once the FAC regained a semblance of control after this explosion, they started to move people outwards, away from the immediate area of the blast, and set up a 1-km safety cordon around the site (see Map 5.2).

A third large explosion occurred at approximately 9:40 a.m. (Rawson, 2013b). By this stage, most of the bystanders had fled the area, leaving behind those who were rescuing victims at the scene. Local press reported irregular secondary explosions until midday on 6 March (N'Zobo and Mavanga Balaka, 2012).

Causes

The primary cause that triggered the first explosion is a sensitive issue. Ammunition depot explosions can be triggered by a variety of factors, including lightning, rough handling, electrical faults, and the auto-ignition of propellant (spontaneous combustion). Within the framework of the UEMS project, the Small Arms Survey refers to these triggers as 'primary causes', meaning the specific event or condition that caused the ammunition to ignite (Berman and Reina, 2014, p. 26).

In the case of Mpila, the primary cause that triggered the first explosion is a sensitive issue. The authorities sent mixed messages. A few hours after the blasts, RoC authorities officially reported that the initial blast had been caused by a fire stemming from an electrical fault (MAG, 2012b, p. 2; Nsoni and Yabbat-Ngo, 2012). For months, a government-appointed commission of inquiry worked under the assumption that the fire was set intentionally (Nsoni, 2012a; 2012b). As discussed below, on 9 September 2013 the national criminal court convicted a FAC non-commissioned officer of the crime of having deliberately set fire to the Mpila depot (*Jeune Afrique*, 2013a). No independent, technical assessment has yet been commissioned to identify the primary causes of the explosions.

Beyond the immediate, primary cause of the Mpila depot explosions, there were underlying structural conditions that facilitated the explosion. This chapter, in line with the UEMS project, uses the term 'root causes' to refer to the broader, structural conditions that, in combination with the primary cause, led to the explosion (Berman and Reina, 2014, p. 24). Understanding how root causes relate to the Mpila context is fundamental to identifying corrective actions.

According to ammunition stockpile management specialists, the most common root causes of UEMS can be grouped into five main categories (Berman and Reina, 2014, table 8):

- lack of surveillance leading to ammunition deterioration;
- inappropriate storage systems and infrastructure;
- handling errors and inappropriate work practices;
- failure to take into account external, environmental influences and events; and
- poor security.

In the case of Mpila, field reports, research notes, and interviews with ammunition and EOD specialists familiar with the explosions indicate that ammunition stockpile management deficiencies falling under many of these categories paved the way to the disaster. Ammunition was reportedly stacked to the ceilings; there was no effort to separate ammunition by type, compatibility grouping, or hazard classification; many of the armoured vehicles on the site were fully loaded with fuzed ammunition, ready to be fired (MAG, 2012a, p. 4); and there was no fence around the site, nor had any effective safety distances been imposed (AOAV, 2012, p. 2).

Alone the scale of damage to military infrastructure suggests exceptionally poor risk management of the ammunition stockpile. The explosions resulted in the destruction of the barracks of six FAC units based in Mpila:

- the 1er Régiment du Génie (1st Engineer Regiment);
- the Bataillon de réparation automobiles et engins blindés (Automobile and Armoured Vehicle Maintenance Battalion);
- the Direction centrale du matériel et du commissariat (Central Directorate of Logistics and Maintenance);
- the 1er Régiment blindé (1st Armoured Regiment);
- the 4ème Bataillon de chars légers (4th Light Armoured Regiment); and
- the Etablissement central de réparation, de rechange et de réserve en armement et munitions (Central Office for Weapons and Ammunition Repair, Replacement, and Reserves, ECRRRAMU), which served as the main barracks and storage area, and was the site of the first explosions.

Each of these units contained several explosive storehouses. For instance, the Groupement du Régiment Blindé de Mpila (Mpila Armoured Group), composed of the 1er Régiment blindé and 4ème Bataillon de chars légers, used four explosive storehouses. One of the four collapsed entirely, burying a large quantity of ammunition underneath the rubble. The three other ones were seriously damaged, with unexploded ammunition still inside (MAG, 2012a, p. 3). The scale of destruction suggests that the depot's explosive storehouses were either not segregated or protected by blast walls or earthworks, or that the stockpiles that were being stored exceeded the capacity of the infrastructure.

Yet an additional factor amplified the explosions. Observers reported during field interviews that, prior to the blast, several⁵ containers filled with ANFO had been parked temporarily by an unidentified foreign road building firm on the premises of the ECRRRAMU barracks. It is unclear how and why the FAC allowed this ANFO to be stored temporarily within the perimeter of the barracks (Rawson, 2013b). The ANFO did not cause the initial blast, but it was probably responsible for the second (main) explosion. It is unclear how many tonnes of ANFO had been stored on site, and



Bags of ammonium nitrate, a fertilizer often used in the manufacture of explosives, contributed significantly to the force of the second blast at the Mpila munitions site, March 2012, Brazzaville. © UNMAT

whether part of this ANFO was already mixed. After the explosion, sacks of Orange Label ammonium nitrate were found scattered around one of the craters (AOAV, 2012, p. 4), and the US EOD team from the Office of Weapons Removal and Abatement subsequently destroyed 20 tonnes of ANFO left over from the ECRRRAMU site (RoC MoD, 2012b; 2012c).

Depot contents

While numerous unknown variables preclude an accurate extrapolation of the quantity of ammunition that was in the Mpila depot prior to the blasts, the FAC reportedly suggested that more than seven million items of munitions were stored in the ECRRRAMU's explosive storehouse *alone* (MAG, 2012a, p. 3; Skilling, 2013). Yet there was apparently no previous accounting of the tonnage of ammunition originally stored in the depot, nor was there any technical assessment of how much ammunition exploded during or burned after the blasts. Consequently, this section is limited to identifying the types and quantities of ammunition that were recovered during clearance operations and subsequently destroyed.

It is difficult to determine what types of ammunition and pyrotechnics were in the depot prior to the blasts. It is unclear whether the FAC ever provided an official list of the types of munitions stored in the depot to assist EOD operators in gauging the level of risk posed to neighbouring communities, or of the types of objects that were likely to be present in contaminated zones. A Survey researcher's field interview notes suggest that, as of April or early May 2012, FAC had not yet provided accurate descriptions or figures to the clearance teams (Lazarevic, 2012). According to the French NGO Demeter, the FAC provided a basic list of ammunition types (not quantities) to the joint EOD coordination centre to standardize the clearance procedures among the various EOD teams of disparate training (Demeter, 2012). The list was reportedly used to determine which items should be moved to the temporary storage location, and which had to be destroyed on site.

To obtain a clearer picture of what types of ammunition and pyrotechnics were in the depot, the Survey compiled the monthly reports of the Mines Advisory Group (MAG)⁶ from the joint ammunition destruction site in Bambou.⁷

Table 1 of Annexe 5.1 presents the results, listing the categories, types, descriptions, and cumulative quantities of ammunition recovered and destroyed during the clearance activities undertaken from March 2012 to April 2013. To confirm and complement the contents of this list, the author submitted more than 1,700 field photos and videos⁸ to EOD specialist Alex Diehl for further identification. Further analysis of the field photos taken during clearance operations revealed additional ammunition types that were destroyed by the EOD teams but not inventoried in the monthly destruction reports, probably as a result of incomplete or inadequate reporting. These items are listed in Table 2 of Annexe 5.1.



A fragmentation aircraft bomb, flung out during the explosions, is incorrectly identified as a rocket with a handwritten sign warning local civilians of danger: 'Unexploded rocket; Beware; Danger', March 2012, Brazzaville. © UNMAT

As indicated in Tables 1 and 2 of Annexe 5.1:

- The EOD clearance teams destroyed more than 200 tonnes of ammunition from March 2012 to April 2013, representing a total weight of more than 39 tonnes in net explosive content.
- The depot stored a mixed selection of ammunition and pyrotechnics that was not necessarily relevant to the FAC units' functions, such as aircraft bombs and submunitions stored in light armoured cavalry and engineer regiments.
- It is unclear whether the depot contained surplus or operational ammunition stockpiles. As discussed below, the ammunition types listed in Tables 1 and 2 are not recent. The few items for which markings were visible and legible on field photographs were not of recent manufacture.
- According to Table 1, small arms ammunition represented almost 21 per cent (almost 42 tonnes) of the total weight destroyed. However, it must be stressed that in general small arms cartridges (Hazard Division 1.4S) do not contribute to the effects of an explosion and can, on the contrary, be used as emergency traverses or barricades in ammunition storage areas (UNODA, 2011a; 2011d, s. 9.2.1.).
- More importantly, medium- and large-calibre projectiles represented just under 42 per cent (almost 84 tonnes) of the total weight destroyed; free flight rockets almost 26 per cent; and missiles nearly 10 per cent. Table 1 of Annexe 5.1 shows a large number of high-explosive projectiles with a calibre exceeding 100 mm, some of which were found with sensitive fuzing systems. This had important consequences for the speed and efficiency of clearance operations because International Mine Action Standards require specific EOD levels for all operators handling UXO with these calibres (UNMAS, 2013, s. 4.2.).

The Mpila depot stored a mixed selection of ammunition and pyrotechnics.

Provenance of the ammunition

It is difficult to ascertain the origin and provenance of this large, centralized stockpile of ammunition. Research suggests three non-exclusive possibilities; specifically, the Mpila depot may have contained ammunition that was:

- collected during previous DDR programmes;
- transferred by and inherited from neighbouring countries and their troops during the conflicts of the 1990s; but mainly
- procured externally before and—to a lesser extent—during and after the conflicts.

The legacy of militias

During the conflicts of the 1990s, most fighting took place among three militias (the Cobra, Cocoye, and Ninja) that enjoyed political and military primacy—and that effectively replaced the official armed forces. Total militia force levels were low—not exceeding 2,000—during the conflict of 1993–94 but increased with the mass militia recruitments during the conflicts of 1997 and 1998–99. For 2002, Survey researchers estimate lower and upper thresholds of total militia force levels at 26,000–36,400 combatants, with an average total militia force level of 31,200 (Demetriou, Muggah, and Biddle, 2002, p. 14.; Biddle et al., 2003, p. 264).

The militias acquired most of their weapons and ammunition by looting government arsenals, including police and military weapons depots as well as military academies (Demetriou, Muggah, and Biddle, 2002, annexe 4; Biddle et al., 2003, p. 258; Muggah and Nichols, 2007, p. 39).

After the conflicts, a significant number of these weapons and munitions were unsecured. The government undertook several DDR programmes, often in collaboration with international partners, to disarm and reintegrate militia members. According to data provided by the DDR Commission, the RoC led five DDR programmes between 1999 and 2011, all of which were largely concentrated in the Pool region. During this period, 366,500 items labelled 'ammunition and explosives' (unspecified) were reportedly collected during voluntary surrender operations (Small Arms Survey

Box 5.1 Timeline of key events in the RoC: 1970–2012

1970

Mariem Nguabi proclaims the RoC a Marxist People's Republic with the Parti Congolais du Travail (Congolese Labour Party, PCT) as its sole legitimate party.

1977

March: Nguabi is assassinated. Joachim Yhombi-Opango becomes president.

1979

The PCT forces Yhombi-Opango to resign and elects Denis Sassou Nguesso as his successor.

1981

The RoC signs a treaty of friendship and cooperation with the Soviet Union.

1990

The PCT abandons Marxism.

1992

Establishment of a multi-party system. Pascal Lissouba, former prime minister and head of the Union panafricaine pour la démocratie sociale (Pan-African Union for Social Democracy), becomes president in the RoC's first democratic election. A power struggle ensues with Sassou Nguesso, head of the PCT, and Bernard Kolélas, head of a coalition known as the Union pour le renouveau démocratique (Union for Democratic Renewal).

1993

November: Disputed parliamentary elections deteriorate into violent conflict between rival militias. The crisis militarizes the RoC's political culture. Brazzaville and environs experience numerous armed confrontations at the end of the year.

1994

January: The belligerents agree to a ceasefire. Peace gradually returns after a period of insecurity lasting for the whole of 1994 and most of 1995, particularly in Brazzaville.

1997

June: Tensions rise in the run-up to the July presidential elections. On 5 June, government troops raid Sassou Nguesso's home in Mpila to arrest suspects in the murder of four of his opponents. His Cobra militia resists and the fighting spreads. By 9 June the Cobras are in control of some two-thirds of the capital.

October: On 15 October Sassou Nguesso's Cobra rebels, backed by troops sent by Angola, prevail, driving Lissouba into exile.

1998

The Congolese government uses the FAC, the national police, and Cobra forces to pacify the southern regions of the country and disarm the Cocoye and Ninja militias. This sparks rebellions in the Bouenza and Pool regions in late 1998; the unrest culminates in full-scale fighting throughout the south of the country and Brazzaville.

1999

November: Rebels have lost all their key positions to the government forces, who are backed by Angolan troops. On 16 November, the Sassou Nguesso administration announces an amnesty for the three warring militias. A ceasefire accord follows in December 1999.

2000

January: A committee is established to demobilize the ex-combatants—mainly the Cobra, Cocoye, and Ninja militiamen—and to collect weapons in circulation.

2002

January: The Congolese approve a new constitution by referendum.

March: Sassou Nguesso is re-elected while Lissouba and Kolélas are forced into exile. The political situation deteriorates precipitously, following the abrupt termination of negotiations between the DDR commission and the leader of the remaining Ninja militia in the Pool region. The RoC army and air force proceed to increase military pressure on the region. Armed violence quickly spreads to Brazzaville.

2003

17 March: The Congolese government signs a peace agreement with the Ninja rebels of the clergyman known as Pastor Ntumi.

2009

July: Sassou Nguesso is re-elected.

2012

March: Explosions rock the Mpila depot.

Sources: BBC News (n.d.); Demetriou, Muggah, and Biddle (2002); Biddle et al. (2003); Muggah and Nichols (2007)

and GRIP, 2013, p. 27; HC, 2013). This figure certainly includes any large-calibre, high-explosive, and incendiary projectiles used by the warring parties. Among them is the RPO-A ‘Shmel’, a rocket-propelled incendiary projectile launcher produced in the Russian Federation (since 1988) and China (since 1998). As mentioned in previous Survey research, this launcher was imported en masse and was used extensively during the 1997 conflict (Demetriou, Muggah, and Biddle, 2002, p. 12.; Biddle et al., 2003, p. 262). Table 1 of Annexe 5.1 confirms that at least 15 RPO-A ‘Shmel’ launchers were stockpiled in the Mpila depot prior to the explosions and subsequently destroyed by the EOD teams.

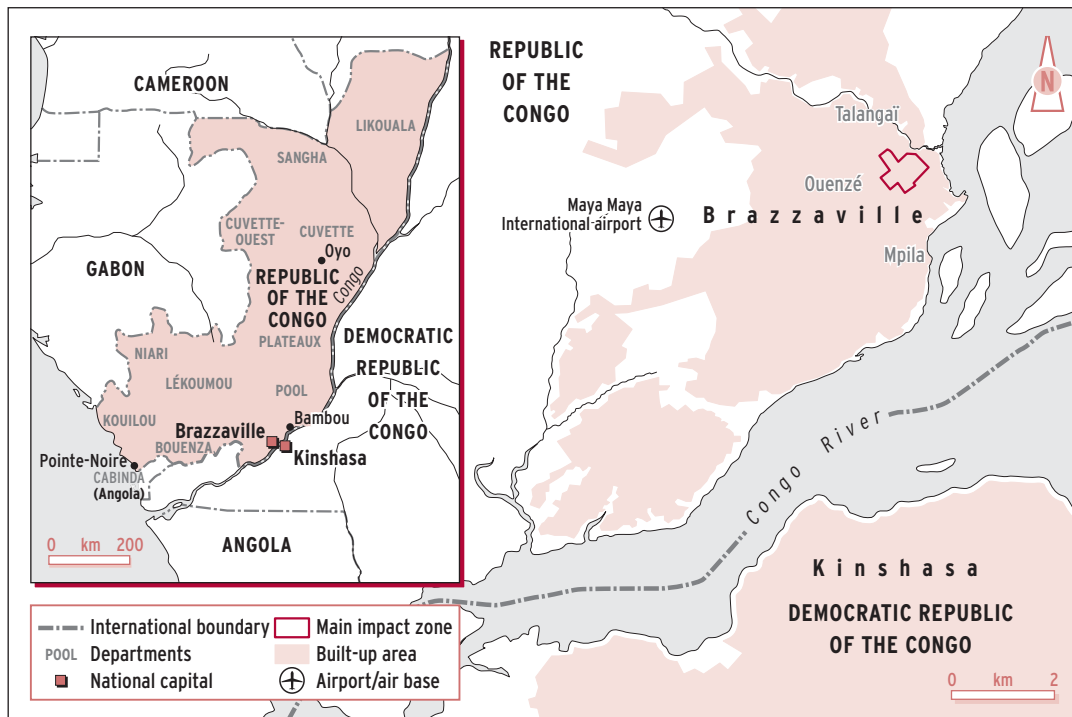
While a portion of the collected ammunition was neutralized, burned, and destroyed, it is likely that many of the items that were collected by the government and by the DDR implementation committee were reinstated in FAC stockpiles (Biddle et al., 2003, p. 269; Muggah, Maughan, and Bugnion, 2003, p. 15; Small Arms Survey and GRIP, 2013, p. 27).

The role of neighbouring countries and their troops

Since the Portuguese decolonization of Angola in the mid-1970s, Brazzaville has been a major weapons and ammunition transit hub. During the Angolan civil war, the Russians opened up a new route for arms deliveries via the RoC, whereby weapons and munitions were either shipped to the Congolese port of Pointe-Noire and then smuggled into the Cabinda enclave by truck, or flown into the Maya Maya air base, in Brazzaville, before being transported into Angola (Moss, 1977; see Map 5.1).

Later, in 1994, following the signing of the Lusaka Protocol, the Angolan rebel movement União Nacional para a Independência Total de Angola (UNITA) of Jonas Savimbi moved weapons and ammunition from Angola into President Pascal Lissouba’s Congo in order to avoid UN monitoring of the disarmament and demobilization efforts that were

Map 5.1 Brazzaville, Republic of the Congo



to follow the peace agreement. The weapons were then progressively transported back into UNITA territory from Pointe-Noire. Lissouba reportedly retained a portion of these weapons and ammunition as a fee for their storage. During this period, the RoC was a major sanctions-busting hub for hundreds of tonnes of UNITA weaponry, which were transported from Bulgaria to UNITA-held territories via then Zaire and Pointe-Noire in the RoC (Small Arms Survey, 2001, p. 118.; Biddle et al., 2003, ns. 16, 27; UNSC, 2000).

During the conflict years, neighbouring countries, wishing to tip the balance of forces in favour of their preferred side, also transferred weapons and ammunition. In September 1997, for instance, Angola and Gabon facilitated a turn in the tide of conflict by supplying at least two major shipments of conventional weapons, munitions, and armoured vehicles to Cobra forces, which were supporting Denis Sassou Nguesso against Pascal Lissouba. The Angolan shipment was allegedly air-dropped north of Brazzaville. The Gabonese shipment was reportedly flown into the town of Oyo and then transported by road to Brazzaville (Demetriou, Muggah, and Biddle, 2002, p. 13).

It is difficult to ascertain the provenance of this large ammunition stockpile.

Regular and irregular troops from Angola, Burundi, the Democratic Republic of the Congo (DRC), Gabon, and Rwanda participated in the RoC's conflicts and brought their share of large-calibre ammunition. The fighting in Brazzaville in 1997 occurred after the fall of Kinshasa to the forces of Laurent-Désiré Kabila in May. Former members of Mobutu Sese Seko's Forces Armées Zairoises and the special presidential division as well as other units fled across the Congo river to Brazzaville. Members of Rwanda's armed forces and the Hutu Interahamwé militia were also present. The groups sided with either Lissouba or Sassou Nguesso (IRIN, 1997; Le Pape and Salignon, 2001, p. 70; *Africa Confidential*, 2004).

The major weapons systems that seem to have influenced the conflict belonged not to the FAC but to foreign—in particular Angolan—units supporting the rebels that had ousted the government in 1997 (Wezeman and Wezeman, 1998, p. 15). The Angolan army's intervention reportedly tilted the balance in mid-October 1997. In 2002, Sassou Nguesso's soldiers were again backed by around 1,000 Angolan troops protecting airports and other key points in Brazzaville and the port of Pointe-Noire.⁹

It appears that at least some of the ammunition originally transferred or brought in from neighbouring countries during the conflicts was stored indefinitely in the stocks of the FAC, including in the Mpila depot. During a recent baseline study on the fight against the illicit accumulation and trafficking of firearms in Africa, RoC officials from the Interior and Defence ministries verbally confirmed that weapons and ammunition seized from combatants fleeing the DRC had in fact been stockpiled in Mpila (Small Arms Survey and GRIP, 2013).¹⁰

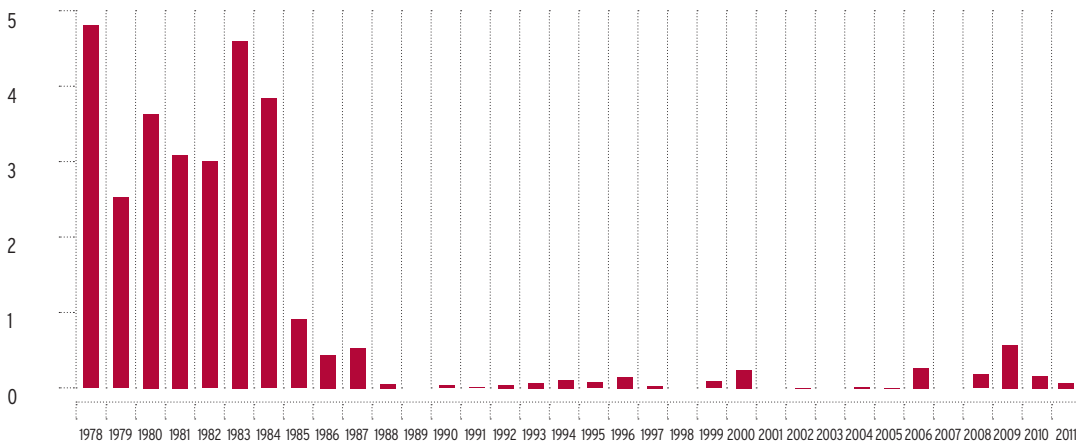
External procurement before the blasts

Research suggests that the Mpila depot also contained large-calibre ammunition that was procured abroad prior to the blasts. Some ammunition transfers were officially declared and recorded, either by the RoC as a recipient, or by its suppliers. For this section of the chapter, the Norwegian Initiative on Small Arms Transfers (NISAT) provided the Survey with raw data¹¹ on recorded weapons and ammunition imports and exports into the RoC during the period 1962 to 2011. Countries reported data via several sources, including UN Comtrade, consolidated EU reports, Eurostat, and national arms export reports. The Survey isolated the reporting categories that encompassed large-calibre ammunition types most pertinent to a depot explosion and similar to the ammunition types found in Tables 1 and 2 of Annexe 5.1.

Analysis focused on large-calibre ammunition, and included various reporting categories.¹² Efforts were made to avoid double counting, which occurs when the same shipment is recorded in two (or more) ways. The following criteria were used to determine if a duplicate entry exists: provenance, currency valuation, timeframe, and export category. For details on the categories and on the methodology used to process the data, see Annexe 5.2.

Figure 5.1 **Declared values of large-calibre ammunition exports to the RoC, 1978–2011**

VALUE OF EXPORTS (INFLATION-ADJUSTED USD, MILLIONS)



Note: See endnote 12 and Annexe 5.2 for a detailed listing of reporting categories.

Figure 5.1 provides an overview of the cumulated values of declared large-calibre ammunition exports to the RoC between 1978 and 2011, as reported by category to the various instruments and sources. While data exists from 1962 to 2011, the period between 1962 and 1977 contains very little declared import activity for large-calibre ammunition and is thus omitted.

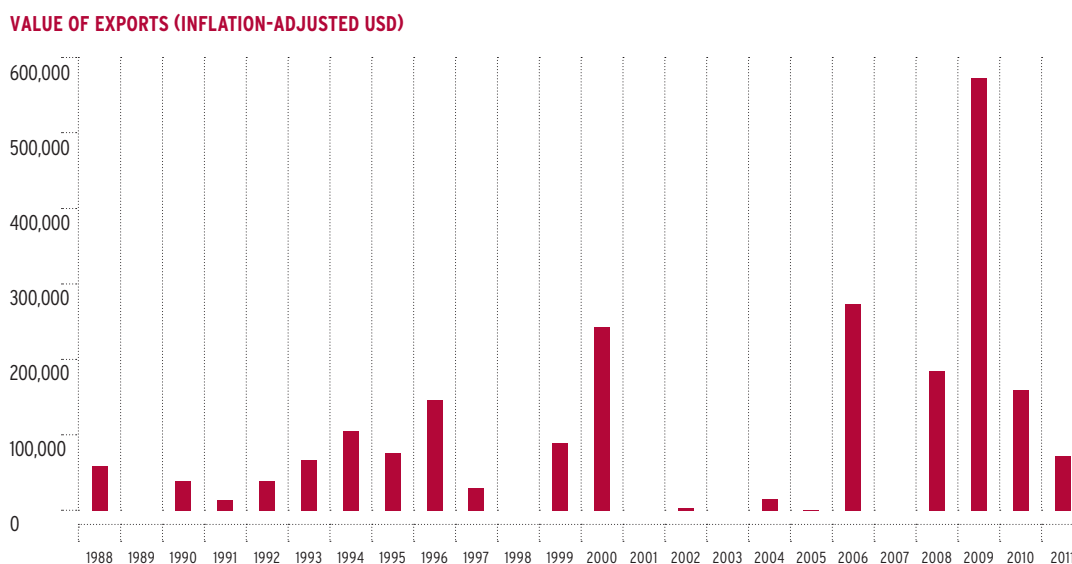
According to the declared values shown in Figure 5.1, the RoC imported the bulk of its large-calibre, high-explosive ammunition arsenal between the late 1970s and the mid-1980s, more than ten years before the conflicts of the early and late 1990s, during which some of this ammunition was certainly used. The bulk was stored indefinitely by RoC authorities in various FAC units and was probably centralized in and around the seat of government, Brazzaville. As mentioned earlier, the ammunition types sampled in Tables 1 and 2 of Annexe 5.1 are not recent either, suggesting that they were procured more than 30 years before the blasts and, in some cases, subsequently stored in the Mpila explosive storage area.

Figure 5.1 corroborates the claim that inadequate ammunition stockpile management is the root cause of the Mpila depot explosions. Under optimal storage and surveillance conditions, the effective service life of most ammunition is at least 20 years (UNODA, 2011c, p. 6). Yet environmental factors and inadequate storage conditions influence the ageing process. The service life will be significantly reduced if the ammunition is stored in climatic conditions for which it was not designed. In the case of Mpila, high and fluctuating temperatures, direct sun, and high humidity undoubtedly led to a rapid degradation of the performance and safety of inadequately stored explosives.

One impact that such storage conditions may have had on ammunition is the chemical deterioration of propellant. According to the International Ammunition Technical Guidelines (IATG), the rate of chemical deterioration of stored propellant is approximately doubled for every 10°C rise in temperature above 30°C. Most propellants have a shelf life of at least 15 to 40 years when stored at a constant 30°C, and they will last much longer in temperate climates (UNODA, 2011e, p. 5). In high-heat environments such as the RoC, the stabilizer depletes far more rapidly, increasing the chances of spontaneous combustion due to autocatalytic ignition.

Figure 5.1 shows that declared exports to the RoC of categories comprising large-calibre ammunition dropped sharply from the late 1980s onwards. Yet it also reveals that the RoC continued to import certain materiel, particularly (i) during periods preceding tension, (ii) during phases of conflict, and (iii) after the conflicts.

Figure 5.2 Declared values of large-calibre ammunition exports to the RoC, 1988–2011



Note: See endnote 12 and Annexe 5.2 for a detailed listing of reporting categories.

Like Figure 5.1, Figure 5.2 shows export values for materiel imported into the RoC, but it focuses on the years 1988–2011. Declared, post-conflict transfers of large-calibre ammunition occurred despite (i) ongoing DDR programmes in the RoC in 1999–2011, (ii) international capacity building efforts in the field of EOD and stockpile management, and (iii) field reports documenting the country’s difficulties with ammunition stockpile management, as discussed below.

Figure 5.2 provides but a partial overview of the RoC’s external ammunition procurement in the years that preceded the blasts. Most importantly, the data fails to capture munitions transfers that were poorly recorded—or simply not declared—by the RoC or by its suppliers. Previous Survey research indicates, for example, that the 1997 conflict involved significant arms purchases from abroad, in contrast to the conflict of 1993–94, which was fought primarily with weapons pillaged from government depots (Demetriou, Muggah, and Biddle, 2002, p. 11; Biddle et al., 2003, p. 261). Survey research also documents the brokering activities of Belgian national Jacques Monsieur, a former army officer who supplied surplus ammunition and weapons—some of them from Iran¹⁵—to the RoC in 1997 (Servenay, 2004; Small Arms Survey, 2001, box 3.5). From June to September 1997, Lissouba reportedly ordered from Monsieur 12 consignments of weapons and munitions worth USD 61.4 million, including ‘rockets, missiles and bombs’ (Lallemant, 2002; Biddle et al., 2003, n. 21).

Similarly, Figure 5.2 fails to highlight the significance of Chinese and South African exports to the RoC during the 1997 conflict (Biddle et al., 2003, ns. 22, 23; Batchelor, 2010, tables 2, 3). Research shows that China was still the number one supplier of conventional arms to the RoC in 2006–2010 (Wezeman, Wezeman, and Béraud-Sudreau, 2011, table 2.4).

THE CONSEQUENCES OF THE BLASTS

This section assesses the impact of the blasts on the population, government, and city infrastructure as well as on the country’s socio-economic development. It draws heavily on data provided by Ricardo Zapata-Martí (2013), regional adviser of the Disaster Evaluation Unit at the United Nations Economic Commission for Latin America and the Caribbean

(ECLAC), who participated in a damage and loss assessment (DaLA) workshop sponsored and conducted by the World Bank in Brazzaville from 23 to 31 July 2012.

The goal of the DaLA workshop was to (i) assess the monetary cost and social and environmental implications of the explosion, (ii) enhance national capacities to undertake such an assessment, and (iii) teach and promote the methods and tools to evaluate damage, loss, and reconstruction needs in post-explosion Mpila. The event gathered more than 150 Congolese participants (civil servants and members of the private sector as well as international organizations). Organizers divided participants into 13 working subgroups and tasked them with sector-specific data gathering (World Bank, 2012a; 2012c). They compiled the limited field data into a rough estimate of direct damage and indirect loss¹⁴ incurred in the various sectors.

Table 5.1 summarizes the limited, unofficial assessment made during the training mission, by sector, in terms of direct damage and indirect loss. No data was available for the sectors of commerce, environment, health, industry, public infrastructure, or social affairs. Consequently, Table 5.1 presents only a partial estimate of the total damage and loss—mainly in terms of direct physical impact on the private sector—which nevertheless exceeds XAF 336 billion (USD 672 million).

The major limitation of the DaLA methodology in assessing the impact of the Mpila explosions is linked to a general lack of field data that should have been contributed by the national bodies involved in the evaluation. Some government agencies did not provide data that they deemed sensitive or confidential. The Ministry of Defence, for instance, did not provide the stockpile value of the weapons and ammunition destroyed in the blasts. More generally, the figure reported under ‘public sector’ includes neither military damage or loss, nor government compensation to the affected population, which was budgeted at XAF 3 million (USD 6,000) per beneficiary, as discussed below. Important contributors, such as the Ministry of Finance, did not participate in the workshop.

The workshop did not produce a definitive evaluation document. The RoC government committed to (i) collecting the missing field data from the various government stakeholders and (ii) acquiring the required resources and personnel to finalize the report (World Bank, 2012c, p. 8). At the time of writing, RoC authorities had not yet finalized a full assessment report. The following sections thus attempt to break down, and, whenever possible, supplement, this rough assessment of impacts by focusing on specific sectors.

Table 5.1 Impact summary: partial estimate as of 27 July 2012, in XAF (millions) and USD (millions)

Sector	Damage	Loss	Total
Agriculture	XAF 2,200 (USD 4.4)	n/a	XAF 2,200 (USD 4.4)
Education	XAF 2,034 (USD 4.1)	n/a	XAF 2,034 (USD 4.1)
Energy	XAF 339 (USD 0.7)	XAF 182 (USD 0.4)	XAF 521 (USD 1.0)
Fishing	XAF 250 (USD 0.5)	XAF 422 (USD 0.8)	XAF 672 (USD 1.3)
Housing	XAF 315,220 (USD 630.4)	n/a	XAF 315,220 (USD 630.4)
Transport	XAF 10,911 (USD 21.8)	XAF 473 (USD 1.0)	XAF 11,384 (USD 22.8)
Water and sanitation	XAF 4,000 (USD 8.0)	n/a	XAF 4,000 (USD 8.0)
TOTAL	XAF 334,954 (USD 669.9)	XAF 1,077 (USD 2.2)	XAF 336,031 (USD 672.1)

Note: n/a = not available.

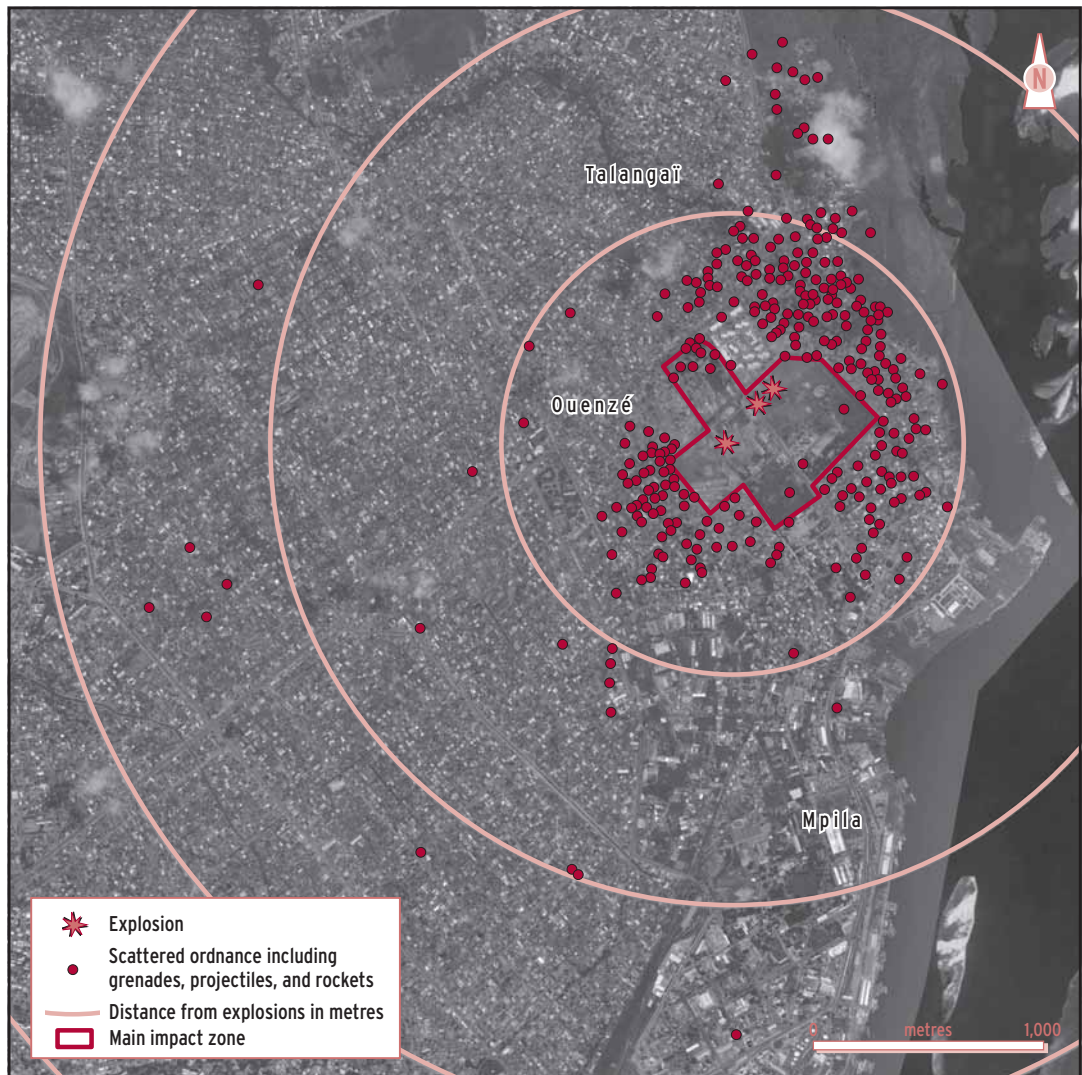
Source: Zapata-Martí (2013, table 3)

Damage radius of the blasts

Protecting the public from the effects of an explosive event involves the use of separation distances, which ensure that the population is always at a reasonably safe distance from explosives during storage and handling. The greater the separation distance, the greater the protection (UNODA, 2011b, p. v). Given the abovementioned contents of the depot, the gradual expansion of Brazzaville's civilian population towards the explosive storage area of Mpila was extremely dangerous.

The blast radius of the Mpila explosions is indicative of the damage caused in the context of urban sprawl. Despite a formal government ban on housing in the immediate surroundings of the depot, the area had been steadily urbanized into a dense grid of houses and small trading entities, built erratically without prior planning, safety restrictions, or government approval. There was no buffer zone to protect the population from the blasts.

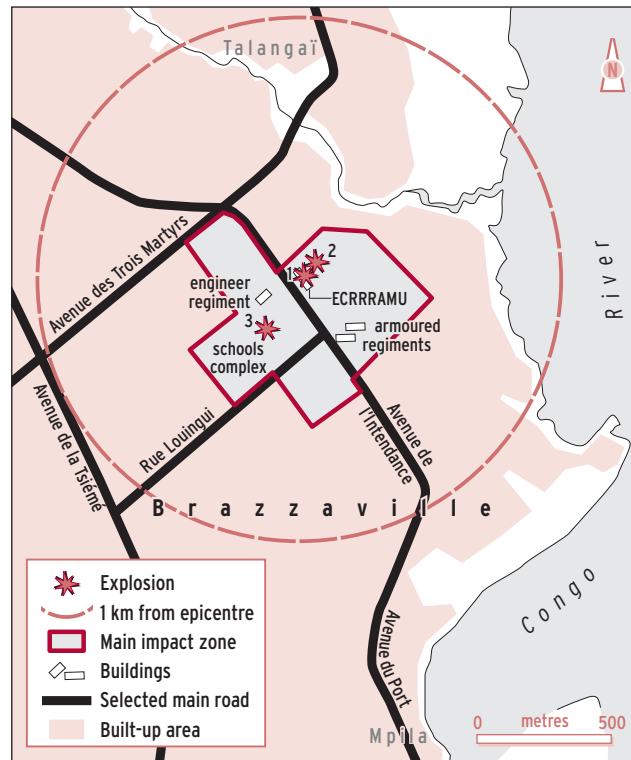
Figure 5.3 **Distribution and concentration of ordnance scattered during the Mpila explosions, 22 March 2012**



Contamination by UXO was extremely high within a 1-km radius of the affected area (UNMAS, 2012b). The impact zone, the most highly contaminated area, had a surface area of 50–60 hectares and extended to a radius of 500 m. This area was predominantly dedicated to homes and offices of military personnel. Within this zone, clearance teams delineated Sector 4—nicknamed ‘ground zero’—which covered a surface area of 40.8 hectares. It comprised four high-impact locations: the ECRRRAMU site (the epicentre of the blasts), the schools complex (high school, primary school, and kindergarten), two armoured battalion compounds, and two craters formed by the explosions (MAG, 2012c) (see Map 5.2).

The blasts projected rockets complete with warhead and fuze out to a 1-km radius, with the fuzes armed by the propulsive effects of the blast causing the warheads to detonate on impact, resulting in further casualties. Expanded rocket motors with no warhead attached were found up to 3 km from the epicentre, while larger expanded 122 mm rocket (Grad) motors landed up to 5 km away (see Figure 5.3; Rawson, 2013b–d).

Map 5.2 Mpila munitions depot explosions



Based on: © OpenStreetMap contributors (open database licence)

The human toll

Based on information provided by the UN Office for the Coordination of Humanitarian Affairs (OCHA) and the Ministère des affaires sociales, de l'action humanitaire et de la solidarité (Ministry of Social Affairs, Humanitarian Action, and Solidarity, MASAHS), the DaLA workshop presented an initial estimate of the human toll of the explosions (see Tables 5.2 and 5.3).

The districts of Talangai and Ouenzé, which cover a surface area of about 26.5 km² and were home to more than 520,000 people before the blasts, suffered the most damage (World Bank, 2012b, p. 2; see Table 5.3). Subdistricts 54, 59, 61, 63, and 64, where more than 93,000 inhabitants resided, were entirely destroyed. Of nearly 62,000 people who lived in Subdistricts 56 and 62, 50 per cent and 45 per cent, respectively, were directly affected. This population includes mostly small merchants, independent workers, day labourers, and artisans with a relatively significant, although unknown, percentage of immigrants from neighbouring countries.

Following the workshop, these figures were often increased on revision. For instance, the total affected population was later estimated at 121,841 (Zapata-Martí, 2013). Estimates of the number of injured came in at 1,500, 3,000, and 3,277 (UNMAT, 2012b; Skilling, 2013; IFRC, 2012, p. 2). The number of reported deaths first increased to 286 and then to 292 (IFRC, 2012, p. 2; AOV, 2012, p. 4); yet even the latter estimate remains an underestimate since the MoD

Table 5.2 Estimated human toll of the explosions, as recorded by OCHA on 16 March 2012

Category	Total/%
Deceased	232
Injured	2,500
Displaced population (including in public and private shelters, and staying with family and friends)	121,654
Total population in the affected communities (estimated in 2010)	520,043
% affected over total affected communities	23.39%
Brazzaville total population	1,373,382
% affected over total urban area (Brazzaville)	8.86%
Total population of RoC	3,697,490
% affected in country	3.29%

Source: Zapata-Martí (2013)

Table 5.3 Estimated human toll of the explosions in the districts of Ouenzé and Talangai, as recorded by OCHA on 16 March 2012

Category	Total	Ouenzé district			Talangai district			
		S54 and S59*	S56	Subtotal**	S61 and S64	S62	S63	Subtotal**
Affected population	121,654	25,343	7,311	32,654	53,187	21,239	14,574	89,000
Total population in the affected communities (2010 estimate)	520,043	25,343	14,622	182,057	53,187	47,197	14,574	337,986
% affected over total affected communities	23%	100%	50%	18%	100%	45%	100%	26%

Notes: * S = subdistrict; ** Including other subdistricts.

Source: Zapata-Martí (2013)

did not report military casualties. Local press mentioned the (unconfirmed) figure of 200–300 dead among the military, indicating that most of these fatalities occurred during the second explosion, while military personnel were assisting the DGE officer after the initial deflagration (*La Semaine Africaine*, 2012a; Rawson, 2013b).

In March 2012, between 13,000 and 17,000 people found shelter in at least 11 public and private camps¹⁵ (Zapata-Martí, 2013, table 1; EU, 2013, p. 14). The number decreased over time,¹⁶ but managing the camps remained a significant sanitation and security challenge. The camps were overcrowded as they attracted numerous refugees, including from the DRC (Lazarevic, 2012). Sanitary conditions quickly deteriorated, with reported cases of cholera, malaria, and infectious respiratory diseases (Yabbat-Ngo, 2012b; Zapata-Martí, 2013, p. 5).

Civilian unrest grew. The blasts caused long-lasting psychological trauma among the population (Lazarevic, 2012). The people blamed the government and were angered at Charles Zacharie Bowao, the minister of defence, for initially



Workers construct graves for people killed in the Mpila blasts, in preparation for a mass burial service, to be held a week after the explosions, 9 March 2012, Brazzaville. © Guy-Gervais Kitina/AFP Photo

trying to understate the extent of the damage (Bowao, 2012; Nsoni and Yabbat-Ngo, 2012, p. 3). At the national burial ceremony, on Sunday, 11 March 2012, Congolese police and gendarmerie units were reinforced to anticipate demonstrations and prevent public order disturbance (Yabbat-Ngo, 2012a). Later, EOD operations were suspended several times because of riots or demonstrations (AOAV, 2012, p. 11; Lazarevic, 2012). Ultimately, the lingering presence of large quantities of UXO prevented thousands of people from returning to their homes and schools for more than one year.

Government spending

On 17 April 2012, the government and parliament voted for a supplemental budget to fund the post-blast emergency response and recovery. The minister of economy indicated that the funds were specifically earmarked to address the consequences of the explosions; that is, to provide cash to affected families, to pay for camps for people displaced from their homes, and to deliver education services to ensure children did not lose the entire school year. Figures provided in a press declaration indicate that just over XAF 400 billion (USD 800 million) were earmarked for this purpose (Yabbat-Ngo, 2012c; 2012d).

The supplemental budget also foresaw the creation of two separate emergency funds, one for victim compensation (XAF 25 billion or about USD 50 million), funded directly by the state, and another for the reconstruction of

affected districts (XAF 60 billion or USD 120 million), funded largely by external loans and donations (*La Semaine Africaine*, 2012b; Yabbat-Ngo, 2012c; RoC, 2012, pp. 33, 36).

The government reportedly earmarked more than XAF 90 billion (USD 180 million) for allowances, compensation, and social support (Yabbat-Ngo, 2012c). On 8 March the government decided to allocate XAF 3 million (USD 6,000) to the heads of households affected by the explosion (Doko and N’Kouka-Koudissa, 2012), to help them move out of the camps and settle elsewhere. In total, 20,333 affected households reportedly received about XAF 61 billion (USD 122 million) allocated as ‘emergency funds’ (Untitled, 2013). The allocation of allowances was not without problems, however. There were a high number of irregularities in the drafting of the lists, as well as discontent with the allocation process (*La Semaine Africaine*, 2012c).

It is difficult to estimate government spending on UXO clearance activities. The EU-funded evaluation explicitly deplores the poor participation of the RoC, now considered a middle-income country, in the direct funding of the rubble excavation, clearance, and risk education operations (EU, 2013, p. 39). The government reportedly earmarked an estimated XAF 2 billion (USD 4 million) for UXO clearance activities (Yabbat-Ngo, 2012c), yet it is unclear how or whether this sum was spent.

As an in-kind contribution, the government seconded between 140 and 180 military personnel to work in collaboration with EOD operators (GICHD, 2012, p. 5; RoC MoD, 2012d, p. 8). The FAC hosted the clearance coordination centre as of 8 March 2012, with



Recoilless rifle rounds (75 mm), collected from the debris of the Mpila explosions, are grouped together by clearance teams prior to safe destruction, March 2012, Brazzaville. © UNMAT



support from the UN Mine Action Service (UNMAS), responsible for coordinating the activities of Demeter, Handicap International, and MAG (EU, 2013, annexe 5). The RoC MoD had reportedly allocated XAF 578 million (USD 1.2 million) for the clearance coordination centre (in addition to international contributions). As of 31 August 2012, they reported having spent XAF 230 million (USD 460,000), or 40 per cent of the funds (RoC MoD, 2012d, p. 10).

Although unconfirmed, additional spending may have included the rental of the Bambou open burning/open detonation site—for XAF 200,000 (USD 400) per trimester, paid to the village leader (RoC MoD, 2012e, p. 3), as well as the rental fees for the Swedish Civil Contingencies Agency's armoured excavator once the international organizations had left in January 2013.

The post-explosion investigation incurred unknown administrative costs, as well as significant legal consequences. Throughout the proceedings, the press reported that a number of officials had been officially questioned by the commission of enquiry, including: the defence minister (Charles Zacharie Bowao), the deputy general secretary of the National Security Council (Col. Marcel Ntsourou), the commanding officer of the 4ème Bataillon de chars légers (Col. André Joseph Sahouss), and the DGE's commanding officer (Col. Germain Ickonga Akindou) as well as two of its officers (Cols. Jean-Claude Mopita and Frédéric-Noël Ingani) (Bowao, 2012; Nsoni, 2012a; 2012b). At the time of the investigation, Col. Ickonga Akindou and Col. Mopita were assigned to the clearance coordination centre as national

supervisor and national coordinator, respectively (EU, 2013, p. 25). By early May, a total of 23 individuals (22 military and 1 civilian) had reportedly been arrested and presented to the attorney general's office (Nsoni, 2012c; 2012d).

On 9 September 2013, the court delivered six judgements. The main defendant, Master Corporal Kakom Kouack Blood, was found guilty of having set fire deliberately to the Mpila depots and sentenced to 15 years of forced labour. Col. Marcel Ntsourou, Col. Ikonga Akindou, and three FAC non-commissioned officers were fined and sentenced to various terms of prison and forced labour (*Jeune Afrique*, 2013a; RFI, 2013). The high-profile trial had a dramatic conclusion. On 16 December 2013, after a violent four-hour siege, government forces raided Col. Ntsourou's residence, which resulted in 55 arrests, more than 40 deaths, and Ntsourou's surrender to the security forces (*Jeune Afrique*, 2013c; 2013d).

City infrastructure

Urban lots and parcels affected by the explosions numbered 5,000-6,000.

The DaLA workshop established that between 5,000 and 6,000 urban lots of various sizes were affected by the explosions (Doko, 2012; Loutoumba, 2012). These lots contained private property (with several individual dwellings per lot) and parcels of land or urban areas comprising entities such as homes, shops, businesses, and warehouses. The impact is thus reflected over both the private and public sectors. Damage to transport and energy was estimated at nearly XAF 11 billion (USD 22 million) and XAF 339 million (USD 678,000), respectively (see Table 5.1).

The most affected sector was private housing. The 2012 supplemental budget earmarked XAF 200 billion (USD 400 million) for housing reconstruction projects on first-, second-, and third-perimeter districts in Brazzaville (Yabbat-Ngo, 2012c). Yet more than 17,700 homes were either partially or completely destroyed, with the resulting damage assessment exceeding XAF 315 billion (USD 630 million) (Zapata-Marti, 2013). The DaLA workshop estimated that the combined costs of construction of new housing and rehabilitation of damaged housing amounted to almost XAF 500 billion (USD 1 billion) (Zapata-Marti, 2013). In one example of reconstruction and relocation, the government set out to build 5,000 houses on 350 hectares in Kintélé, about 15 km from Brazzaville. Although the cost of the Kintélé housing project was reportedly estimated at XAF 29 billion (USD 58 million) (Loutoumba, 2012), in November 2013 Congolese authorities contracted a Moroccan company to build 3,250 houses for more than four times that amount (EUR 195 million or USD 267 million) (*Jeune Afrique*, 2013b).

Many school buildings were either partially damaged or totally destroyed. The Lycée de la Révolution, located next to the military barracks, was completely destroyed. Five thousand students normally attend the high school. If the explosion had occurred on a Monday instead of on a Sunday, the school would have been packed with children and the casualty toll would have been far higher. Although the students were transferred to another site, the transport allowance provided by the government was only sufficient to cover fares for ten days (AOAV, 2012, p. 10; Gac, 2012, p. 8). The Pierre Nsiété School, located only 800 m from the main blast, suffered considerable damage, and some UXO was found in the compound (MAG, 2012f). The Ecole du 31 Juillet was 60 per cent destroyed by the blast (Gac, 2012, p. 8). In total, 18,000 to 20,000 students were affected (World Bank, 2012b, p. 2; Lazarevic, 2012).

Defence spending was also earmarked for the reconstruction of military installations outside cities. One feature of urban sprawl has been the expansion of many residential areas towards military installations. Starting in 2010, additional funds were reportedly spent on stepping up the relocation process of hundreds of FAC members stationed at Mpila (IMF, 2012b, p. 11). The government said it was committing XAF 35 billion (USD 70 million) to the construction of new military barracks, XAF 1.5 billion (USD 3 million) to the rehabilitation of existing barracks, and XAF 50 billion (USD 100 million) to the restoration of the 'operational capacity' of the security forces (Yabbat-Ngo, 2012c). It is unclear

what 'operational capacity' encompasses. The MoD did not provide the actual value of the ammunition destroyed in the blasts, but the XAF 50 billion (USD 100 million) could potentially be used to buy new ammunition to replace the destroyed stockpile.

Socio-economic development

The RoC has a population of more than 4.3 million people, 1.5 million of whom live in Brazzaville; it is considered a lower-middle-income country with a gross national income of USD 2,550 per capita in 2012 (World Bank, n.d.). However, it scores very low on the leading measures of socio-economic development. In the UN's 2013 *Report on Human Development*, the RoC occupies the 142nd place out of 187 countries (UNDP, 2013). The country occupies the



A resident of Mpila raises her hands in dismay as she surveys the debris of her former neighbourhood, 5 March 2012, Brazzaville. © Patrick Fort/AFP Photo

154th place out of 177 in Transparency International's Corruption Perceptions Index and holds 185th place out of 189 in the World Bank's Doing Business 2014 ranking (TI, 2013; World Bank, 2014).

The country's economy is very dependent on the oil sector, which represented 68 per cent of the gross domestic product (GDP) in 2010 (*Africa Confidential*, 2012b). Non-oil exports are minimal (IMF, 2011, p. 18). In its Article IV report, the International Monetary Fund (IMF) highlights that, while the economy was relatively stable, 'growth had not been inclusive, the private sector was not diversified and public spending was still subject to the vagaries of the oil price' (*Africa Confidential*, 2012b; IMF, 2012b).

The explosions had macroeconomic effects throughout the country.

The explosions had macroeconomic effects throughout the country. In 2010, the Central African Economic and Monetary Community and the IMF predicted that inflation would stabilize at 3–4 per cent (IMF, 2011, p. 3). In 2012, the RoC's economic activity was dominated by the emergency budgetary measures taken to face the consequences of the depot explosions. Direct cash transfers to the families affected by the explosions and reconstruction plans boosted the demand for domestic goods. However, additional imports quickly overwhelmed the limited transport facilities between the port of Pointe-Noire and Brazzaville roughly 500 km to the east (IMF, 2012b, p. 34). Additional spending spurred growth, yet the low level of economic diversification and limited domestic capacity to increase supply in response to increased demand fuelled inflation. In other words, although the emergency budget voted in April was aimed at reconstruction, it did little more than kindle import-intensive inflation (*Africa Confidential*, 2012b).

The IMF then announced a GDP growth of 3.8 per cent with inflation reaching 7.5 per cent, up from approximately 5 per cent in 2010 and 2011 (IMF, 2013a; 2011, p. 2). Higher inflation affected vulnerable groups through higher prices and scarcity of staple goods (IMF, 2012b, p. 34). Activity in non-oil related sectors, the weakest link of the RoC economy, was artificially supported by the recovery compensation and the increase in public expenditure. In addition to inflation, the rapid increase in expenditures made the primary fiscal deficit climb to 64.3 per cent of GDP excluding oil, in comparison to 46.3 per cent in 2011 (IMF, 2012a, tables 1, 3b; 2013a). Inflation rates decreased only a year later, and the IMF announced a GDP growth of 5.8 per cent in May 2013 (IMF, 2013b).

The international response

Initially, some donor countries were reluctant to fund the emergency response efforts. This is partly because donors regard the RoC as a relatively wealthy country that should allocate funding for emergency response efforts from the national budget (EU, 2013, p. 15). Nevertheless, donor countries and international organizations contributed significant funding, technical expertise (such as damage assessment and UXO clearance), and material aid (such as water, food, sanitation, and logistical support).¹⁷

In fact, the success of the clearance and risk education¹⁸ activities owes much to the rapid funding. On 30 April 2011, the Central Emergency Response Fund provided nearly USD 7 million to seven UN agencies for emergency risk education, UXO clearance, and the provision of various health, hygiene, and sanitation services and equipment (OCHA, 2012). The EU devoted EUR 2.5 million (USD 3.4 million) to rubble excavation, clearance, and risk education efforts, directly funding the three main implementation partners—Demeter, Handicap International, and MAG (EU, 2013, p. 15).

On a bilateral basis, a host of other donor countries also contributed funds and EOD teams, as well as technical and material support. The EU-funded evaluation report describes the mobilization and the key role of embassies and national representatives, noting the flexibility of the implementation partners, which frequently provided their own funding in order to start field work while awaiting external financing (EU, 2013, p. 15).

STOCKPILE MANAGEMENT: LESSONS LEARNED?

The Mpila depot explosions reflect the global, persistent, and growing threat of UEMS. The Survey has recorded 508 unplanned explosions that took place worldwide between 1980 and 2013. Not one year has passed without a UEMS (Berman and Reina, 2014, p. 10); in more than half of the past 35 years, at least ten UEMS incidents have taken place per year. The greatest number of incidents—37 events—were registered in 2011. Almost 60 per cent of the events recorded in the Survey's UEMS database for the period under review occurred in the years 2003–13.

This section highlights the RoC's history of UEMS, as well as its efforts to improve ammunition stockpile management before and after the Mpila explosions. In addition, it reviews the RoC's multilateral commitments in relation to ammunition management.

Early warning

The Survey's UEMS database contains records of four unplanned explosions at various munitions sites in Pointe-Noire and Brazzaville before the Mpila explosions in March 2012 (Small Arms Survey, n.d.).

In 1997 an ammunition depot exploded in the district of La Poudrière, contaminating 26 hectares of land adjacent to Brazzaville's Maya Maya International Airport. The explosion was probably initiated by a targeted attack, such as shelling, bombardment, or sabotage during fighting, which also caused underground structures to collapse. MAG was still clearing the area with EU funding when the Mpila depot exploded in March 2012 (EC–ECHO, 2012; MAG, 2012g; EU, 2013, p. 16). Three other explosions occurred: in 2008 (details unknown); in April 2009 in Mpila's Camp de l'Intendance (Intendance military barracks) (Nsoni and Yabbat-Ngo, 2012; N'Zobo and Mavanga Balaka, 2012); and in May 2010 in the private depot of a FAC general's residence in Talangai (Dombe Bemba, 2012; Mouébara, 2013).

Prior to the Mpila blasts, the international community had launched several initiatives to improve stockpile management and secure a number of storage sites, yet activities focused on small arms and light weapons management rather than large-scale, large-calibre ammunition storage. In the process, a few organizations reported having accessed the depots that exploded in March 2012.¹⁹

In March 2010 and March 2011, the Defense Threat Reduction Agency (DTRA) of the US Department of Defense organized physical security and stockpile management (PSSM) courses. There was reportedly another one planned for March 2012. These summary courses are designed to provide guidance on how to move and store munitions. The DTRA staff apparently never obtained permission to inspect the ECRRRAMU depot that exploded in March 2012 (Rawson, 2013b).

In September 2011, MAG conducted a survey to assess the PSSM conditions in five storage buildings identified by the FAC as requiring the most support, including the ammunition depot that exploded in March. The FAC invited and granted access to MAG. Following its survey, MAG prepared a proposal for technical support to the FAC for stockpile management; that is, guidance, training, and recommended action. However, although MAG tried to raise awareness of the urgent need for ammunition stockpile management in the RoC, it was unable to secure funding for this activity before the Mpila explosion (*Africa Confidential*, 2012a; GICHD, 2012, p. 6; EU, 2013, p. 22).²⁰ MAG's post-explosion efforts were geared towards emergency response.

International assistance and capacity building

One of the post-emergency priorities was to help the FAC develop an autonomous EOD capacity—that is, a stand-alone unit capable of working without supervision according to best practice and international standards—before international

Before the Mpila explosions, RoC had a history of UEMS.

operators left in December 2012 and January 2013. For this reason, most of the operators trained dozens of FAC members on several occasions at EOD levels 1, 2, and 3, as well as in basic first aid. One FAC officer was instructed in the use of the Information Management System for Mine Action (IMSMA) software in order to collect and analyse the data provided by the operators (UNMAT RoC, 2012a; EU, 2013, p. 37).

The EU evaluation notes that serious weaknesses remained as of January 2013, characterizing the FAC's organic EOD capacity as insufficient and understaffed. The assessment team also mentions the apparent loss of the laptop computer with the IMSMA software, as well as the loss of data recorded during the clearance and risk education activities (EU, 2013, p. 38). Despite such shortfalls, progress was made, as signalled by the creation of a 75-strong EOD platoon under the supervision of an EOD level-3 officer (RoC MoD, 2012a; 2012d).

RoC authorities were less receptive to suggested improvements in ammunition stockpile management. The UN Mine Action Team (UNMAT) commenced dialogue with the FAC in relation to ammunition stockpile management in early April 2012 (UNMAS, 2012c; 2012d). Following the initial emergency assessment missions after the blasts, the plans were discussed with the RoC government—including long-term operational capacity building to respond to stockpile management needs at remaining munitions sites in the RoC, to reduce the likelihood of future events of this kind (MAG, 2012d).

**Several unfruitful
stockpile manage-
ment initiatives were
attempted after the
explosions.**

There were several ad hoc, bilateral, and often simultaneous initiatives. In April 2012 Handicap International proposed an 18-month stockpile management programme that was not implemented (HI, 2012). In a field update dated 7 July 2012, UNMAS mentions its intention to launch an assessment of ammunition storage facilities from 15 July to 30 September 2012. The plan was to access all stockpiles in order to identify needs for immediate rehabilitation of existing facilities and for the construction of new facilities, with a view to launching a training programme on ammunition management based on the IATG (UNMAS, 2012e). In parallel, the FAC reportedly approached MAG to request stockpile management assistance in munitions depots in Pointe-Noire. MAG sought funds to carry out this essential work, but failed to secure them, despite considerable effort (MAG, 2012f). In October–November 2012, the Belgian Embassy and the United States Africa Command organized stockpile management training courses for almost 30 FAC personnel (RoC MoD, 2012e).

Throughout September and October 2012, UNMAT held regular meetings with the FAC and with the MoD to discuss the ongoing activities and next steps of the Mpila project, with an emphasis on stockpile management (UNMAT, 2012b). Yet there was clearly no buy-in from RoC authorities, nor was there the desired donor response (UNMAS, 2012a). In December 2012, UNMAT was still investigating 'possible funds and strategy for a potential PSSM project' for 2013 (UNMAT, 2012c; 2013). In this context, UNMAT conducted a stockpile management technical visit with an RoC delegation in Côte d'Ivoire in December 2012 (UNMAT, 2013). Upon its return, the RoC delegation was asked to draft a document laying out the country's stockpile management policy requirements. As of November 2013, it was unclear whether the document had been drafted or finalized.

Progress has been slow since the publication of the EU evaluation report. A report of the UN Office for Disarmament Affairs mentions an assistance proposal from the RoC to construct and improve applicable storage facilities and to build operational capacity for stockpile management through training and the establishment of standard operating procedures (UNODA, 2012). However, the proposed activities appear focused on small arms and light weapons management rather than large-calibre ammunition storage. Potential implementing partners include the United

Nations Regional Centre for Peace and Disarmament in Africa (UNREC)²¹ and the UN Development Programme RoC (UNODA, 2012; UNGA, 2012, p. 9).

The normative framework

In the RoC's 2010 report outlining its implementation of the UN Programme of Action (PoA), the government identifies capacity building in stockpile management and weapons destruction as a priority area (RoC, 2010, p. 7). Since 2008, UN-hosted follow-up meetings, in particular the outcome document of the Third Biennial Meeting of States, have stressed the importance of stockpile management and surplus disposal, identifying improperly managed stockpiles as an important security threat (UNGA, 2008).

While the PoA does not clearly cover ammunition, certain provisions, such as those pertaining to stockpile management and surplus destruction, could arguably apply to ammunition. This is left to the discretion of UN member states (Bevan, McDonald, and Parker, 2009, p. 145).

The RoC's regional stockpile management commitments also pertain to small arms and light weapons, not to large-scale storage of explosive ammunition. RoC is a signatory to the Nairobi Protocol for the Prevention, Control and Reduction of Small Arms and Light Weapons in the Great Lakes Region and the Horn of Africa, adopted in 2004. In addition, the RoC ratified the Kinshasa Convention on 5 December 2012 (Small Arms Survey and GRIP, 2013a, p. 15; 2013b, p. 23).

As a category, light weapons technically include various explosive weapons, such as light mortar systems or portable missiles and rocket launchers. In Annexe 5.1, Tables 1 and 2 show that light weapons ammunition was present in the Mpila depot, yet UEMS are typically caused by much larger ammunition.

Developed in 2011, the IATGs currently provide the only global framework for large-calibre ammunition stockpile management. The guidelines reflect accepted notions of international best practice, while taking differing national capacities into account.

That said, in many countries with low levels of infrastructure and capacity, it is a lack of political will, not capacity, that prevents compliance with the minimum stockpile standards contained in the IATGs, namely risk reduction process level 1. In the RoC, priorities for the future include:

- dedicating funds to ammunition stockpile management;
- isolating or relocating depots away from urban areas; and
- revising standard operating procedures and ensuring their implementation.

Standard operating procedures for stockpile identification, management, and disposal are currently inadequate and, moreover, poorly implemented. According to a DGE officer, two structures are officially tasked with ammunition depot maintenance and technical surveillance: the Commandement de la logistique (under the responsibility of the FAC chief of staff) and the Direction des armements (under the responsibility of the DGE). Meanwhile, the Inspection générale des armées et de la gendarmerie also appears to have certain responsibilities in this area (EU, 2013, n. 36). Yet the EU field assessment team was unable to confirm the relevant structures and procedures during their visit.

There is also a lack of awareness among those in the RoC who work with ammunition stockpiles. The management of surplus weapons and ammunition is a relatively new concept in the country. When asked about the plans for future ammunition safety management and the ammunition stockpile, a DGE officer said that the stockpile would be built

The management of surplus weapons and ammunition is relatively new to the RoC.

back up to the level it was before the explosions. According to this officer, the explosions had occurred not because they had too much ammunition but because they lacked storage capacity (Rawson, 2013a; 2013b).

CONCLUSION

The explosions that rocked the government ammunition depot located in Brazzaville's Mpila area on 4 March 2012 are symptomatic of the global problem of UEMS. They serve as a warning to many governments that still consider large, excess ammunition stockpiles as assets rather than the liabilities they often are—especially when located in the middle of large, urban residential areas.

This chapter has discussed the various root causes that led to the Mpila explosions, reviewing the extensive impacts incurred by the city, its population, and the RoC as a whole. The nature of the primary cause of the Mpila explosions—reportedly a fire, either accidental or deliberate—is of secondary importance. Of far greater relevance is the fact that the fire triggered a series of powerful blasts that levelled six military barracks and two surrounding, heavily populated districts in a matter of minutes. This was almost certainly due to the lack of basic ammunition management at the depot's multiple explosive storehouses and because the civilian population had not been prevented from settling close to an explosive storage area.

Several factors led to the Mpila depot disaster. Analysis of the types and quantities of ammunition destroyed by EOD teams during the emergency clearance effort reveals an ageing mix of pyrotechnics, small arms ammunition, grenades, mines, large-calibre projectiles, rockets, missiles, and aircraft bombs that were probably procured in the late 1970s and 1980s, transferred and used during the RoC's internal conflicts in the 1990s, and ultimately centralized for indefinite storage in the Mpila barracks. The evidence indicates that these items were amassed with little concern for basic ammunition management and security standards.

The Mpila explosions tragically link dangerous ammunition management practices with severe human and economic harm. Following the explosion, assessments of the damage to health, housing, and infrastructure yielded only partial estimates, and compensation was thus likewise partial. Full reconstruction, to the extent it occurs, will prove costly. Other economic variables affected by the event—such as reductions in income, loss of employment, unrealized production, and business disruption—were impossible to assess comprehensively and, for this reason alone, stand a lesser chance of being addressed through government compensation. The impact of the Mpila explosions was felt nationwide: emergency funding voted in April 2012 was aimed at reconstruction, but it did little more than fuel inflation because the domestic economy lacked the capacity to respond to the stimuli of additional government funds.

The Brazzaville case study shows that long-term efforts for improved ammunition management are time-sensitive; they require immediate and simultaneous buy-in from implementing organizations, donors, and, most critically, the host government. Risk awareness, national ownership, government resolve to prioritize the issue, and medium- to long-term donor commitment are all critical.

As of late-2013, progress on ammunition management in the RoC was slow, indicating timid buy-in from Congolese authorities, as well as donor fatigue and wariness from potential sponsors. Partners and observers agree that since the end of civil war (1997–2003) the country's security situation has gradually improved and is now quite stable. This stability offers the RoC an opportunity to address an often overlooked, yet no less critical, threat: poor ammunition management. ■

LIST OF ABBREVIATIONS

ANFO	Ammonium nitrate/fuel oil
DaLA	Damage and loss assessment
DDR	Disarmament, demobilization, and reintegration
DGE	Direction générale de l'équipement (General Directorate of Logistics and Equipment)
DRC	Democratic Republic of the Congo
DTRA	Defense Threat Reduction Agency
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
ECRRRAMU	Etablissement central de réparation, de rechange et de réserve en armement et munitions (Central Office for Weapons and Ammunition Repair, Replacement, and Reserves)
EOD	Explosive ordnance disposal
EU	European Union
FAC	Forces Armées Congolaises (Congolese Armed Forces)
GDP	Gross domestic product
GICHD	Geneva International Centre for Humanitarian Demining
IATG	International Ammunition Technical Guidelines
IMF	International Monetary Fund
IMSMA	Information Management System for Mine Action
MAG	Mines Advisory Group
MASAHIS	Ministère des affaires sociales, de l'action humanitaire et de la solidarité (Ministry of Social Affairs, Humanitarian Action, and Solidarity)
MoD	Ministry of Defence
NGO	Non-governmental organization
NISAT	Norwegian Initiative on Small Arms Transfers
OCHA	United Nations Office for the Coordination of Humanitarian Affairs
PCT	Parti Congolais du Travail (Congolese Labour Party)
PoA	United Nations Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects
PSSM	Physical security and stockpile management
RoC	Republic of the Congo
UEMS	Unplanned explosions at munitions sites
UN Comtrade	United Nations Commodity Trade Statistics Database
UNITA	União Nacional para a Independência Total de Angola
UNMAS	United Nations Mine Action Service
UNMAT	United Nations Mine Action Team
UNREC	United Nations Regional Centre for Peace and Disarmament in Africa
UXO	Unexploded ordnance
XAF	Central African franc

ANNEXES

Online annexe at <<http://www.smallarmsurvey.org/publications/by-type/yearbook/small-arms-survey-2014.html>>

Annexe 5.1. Summary of ammunition destruction in Brazzaville

Table 1 lists the categories, types, descriptions, and quantities of ammunition recovered and destroyed during the clearance activities undertaken from March 2012 to April 2013. Table 2 lists additional ammunition types that were destroyed by the EOD teams but not inventoried in the monthly destruction reports.

Annexe 5.2. Methodology

This annexe provides details on the methodology used to process the ammunition import and export data featured in this chapter's section entitled 'External procurement before the blasts'.

ENDNOTES

- 1 Data provided by the Norwegian Initiative on Small Arms Transfers (NISAT) of the Peace Research Institute Oslo (PRIO).
- 2 Photos obtained in Brazzaville by the assessment team during the EU-funded evaluation in January 2013.
- 3 In a deflagration, the surface of an explosive burns extremely fast, but not fast enough to become a detonation (Rawson, 2013a).
- 4 ANFO is a quarrying/blasting explosive used by commercial companies to remove rocks and to assist in the excavation of routes, among other uses. It comes as two separate constituents—ammonium nitrate, AN, a strong, commonly used agricultural fertilizer, and fuel oil, normal vehicle fuel. It can be stored safely when unmixed, but when mixed in the appropriate ratio it becomes a very powerful explosive; in most countries it is illegal to store it mixed, any excess having to be destroyed rather than saved or moved to another area. ANFO has more of a 'pushing' effect than a shattering one, which makes it better suited for quarrying, soil removal, and the like. Unfortunately, its composition renders it easily ignitable and, when its volume is large, it burns to detonation with ease (Rawson, 2013a).
- 5 Lazarevic (2012) reports that there were three containers.
- 6 MAG kindly provided the monthly reports during the EU-funded evaluation in January 2013.
- 7 During clearance operations, UXOs were collected by EOD teams from Angola, Demeter, the FAC, France, Handicap International, the International Committee of the Red Cross, MAG, the Swedish Civil Contingencies Agency (Myndigheten för samhällsskydd och beredskap), and the US Office of Weapons Removal and Abatement. A limited amount of items could not be moved and was thus destroyed on site. For the overwhelming majority of items, MAG administered a temporary ammunition storage area on site to keep the enormous amount of UXO and ammunition found in the area in secure conditions. When the temporary stock reached full capacity, items were systematically transported to an external location 60 km north of Brazzaville (the Bambou site), where MAG and the FAC carried out bulk demolitions on behalf of all the clearance actors (MAG, 2012e, p. 6).
- 8 The photos and videos were obtained by the assessment team during the EU-funded evaluation in January 2013.
- 9 Galloy and Gruénais (1997); IRIN (1997); *Africa Confidential* (2002); Lallemand (2002).
- 10 Author correspondence with Cédric Poitevin, Groupe de recherche et d'information sur la paix et la sécurité (GRIP), 4 November 2013.
- 11 Nic Marsh of NISAT provided the data; David Gertiser of the Small Arms Survey carried out the analysis.
- 12 The categories included (per source): UN **Comtrade 89129**:munitions of war; **930111**:self-propelled artillery; **930690**:bombs, grenades, ammunition, mines, and others; **95106**:bombs, missiles, and ammunition; UN **Register of Conventional Arms**: 82 mm mortar; **Eurostat 93069090**:ammunition and projectiles and parts excluding for military purposes; **93SS891**:confidential trade in arms and ammunition; **EU annual reports**: Military List 3: ammunition, fuze setting devices, and specially designed components; Military List 4: bombs, torpedoes, rockets, missiles, other explosive devices and charges, related equipment, and accessories, specially designed for military use; **national reports**:explosives, unguided missiles; and the **media**: surface-to-air missiles.
- 13 Table 1 in Annexe 5.1 mentions the (unusual) presence of Iranian design PG-7 target practice rounds. This is confirmed by visual identification on field photos (author correspondence with Alex Diehl, 16 June 2013 and 10 January 2014).
- 14 In the mid-1970s ECLAC developed the DaLA methodology to assess the impact of natural disasters and to quantify their economic costs. The methodology can be used for non-natural disaster assessments as well (Zapata-Marti, 2013). It distinguishes the concepts of (i) direct damage ('complete or partial destruction' of assets), (ii) indirect loss ('the flows of goods and services that will not be produced or rendered over a time span that begins after the disaster and may extend throughout the rehabilitation and reconstruction periods'), and (iii) macroeconomic effects (impact on the main macroeconomic aggregates of the affected country) (ECLAC, 2003, pp. 9–15). This chapter uses the term 'damage' to refer to concept (i), and 'loss' to refer to concept (ii).
- 15 The camps included Armée du Salut, la Cathédrale Sacré Coeur, Cité des 17, Kimbanguiste, Nkombo, Notre Dame de Rosaire, Saint Grégoire de Massengo, Stade Annexe, and Stade Marchand (Croix rouge congolaise, 2012).
- 16 According to the director of MASAHS interviewed by the evaluation team, as of 7 January 2013 the camps still held 572 families, representing 2,618 individuals (EU, 2013, p. 14).
- 17 It is difficult to estimate the total value of international contributions to the emergency response, and space limitations preclude a comprehensive list of contributors. Among them were the EU, the United Nations (the Food and Agriculture Organization, OCHA, the UN Development Programme, UNESCO, UNICEF, UN Population Fund, the UN Refugee Agency, UNMAS, the World Food Programme, and the World Health Organization), NGOs (including ACTED, Caritas RoC, the Congolese and French Red Cross, Demeter, Handicap International, ICRC, and MAG), and a host of countries (including Angola, Benin, Central African Republic, Chad, China, the DRC, France, Gabon, Germany, Israel, Italy, Japan, Morocco, the Netherlands, Russia, São Tomé and Príncipe, South Africa, the UK, the United States—the US Agency for International Development's Office of US Foreign Disaster Assistance—and Zambia) (EU, 2013, p. 15; World Bank, 2012b, pp. 2–3).

- 18 In Brazzaville, risk education actors coordinated the development and publication of joint guidelines and educational material (EU, 2013, p. 34). These activities were subsequently extended through an education campaign at the institutional level, notably to introduce risk education into the school curriculum (author interview with Hugues Laurence, UNICEF, Geneva, 9 December 2013).
- 19 For instance, in 2007 the UN Development Programme's Bureau for Crisis Prevention and Recovery conducted a one-week stockpile management training workshop, as well as a review of three small arms and light weapons armouries. The on-site visits included the main depot of the ECRRRAMU (BCPR, 2007).
- 20 Author correspondence with Chris Loughran, MAG, 11 November 2013.
- 21 Author correspondence and telephone interview with Karl Wagner and Leonardo Lara, UNREC, 7 June 2013.

BIBLIOGRAPHY

- Africa Confidential*. 2002. 'By Other Means.' Vol. 43, No. 12. 14 June.
- . 2004. 'Brazzaville Breakdown.' Vol. 45, No. 9. 30 April.
- . 2012a. 'Dying by the Sword.' Vol. 53, No. 7. 30 March.
- . 2012b. 'A Poverty of Strategy.' Vol. 53, No. 21. 19 October.
- AOAV (Action on Armed Violence). 2012. *Case Studies of Explosive Violence: Republic of Congo*. June.
<http://aoav.org.uk/wp-content/uploads/2013/06/2012_06_case_study_of_explosive_violence_republic_of_congo1.pdf>
- Batchelor, Peter. 2010. *South Africa's Arms Trade and the Commonwealth: A Cause for Concern?* 21 December.
<<http://carecon.org.uk/Leverhulme/P12.pdf>>
- BBC News. n.d. 'Republic of Congo Profile.' <<http://www.bbc.co.uk/news/world-africa-14121195>>
- BCPR (Bureau for Crisis Prevention and Recovery). 2007. 'One-page Mission Report Summary: Capacity Building (CB) regarding SALW Stockpile Management.' 29 January.
- Berman, Eric G. and Pilar Reina, eds. 2014. *Unplanned Explosions at Munitions Sites (UEMS): Excess Stockpiles as Liabilities Rather than Assets*. Handbook No. 3. Geneva: Small Arms Survey.
- Bevan, James, Glenn McDonald, and Sarah Parker. 2009. 'Two Steps Forward: UN Measures Update.' In Small Arms Survey. *Small Arms Survey 2009: Shadows of War*. Cambridge: Cambridge University Press.
<<http://www.smallarmssurvey.org/fileadmin/docs/A-Yearbook/2009/en/Small-Arms-Survey-2009-Chapter-04-EN.pdf>>
- Biddle, Ian, et al. 2003. 'Making the Difference? Weapon Collection and Small Arms Availability in the Republic of Congo.' In Small Arms Survey. *Small Arms Survey 2003: Development Denied*. Oxford: Oxford University Press, pp. 254–75.
<<http://www.smallarmssurvey.org/fileadmin/docs/A-Yearbook/2003/en/Small-Arms-Survey-2003-Chapter-08-EN.pdf>>
- Bowao, Charles Zacharie. 2012. 'Congo-Brazzaville : "Si je me suis trompé, c'est de bonne foi!".' *Jeune Afrique*, No. 2705. 11–17 November.
- Croix rouge congolaise. 2012. *Rapport définitif sur l'opération assistance aux populations sinistrées de l'explosion du 04 mars 2012 du 06 mars au 27 octobre 2012*.
- Demeter. 2012. 'Aide mémoire des masses par munition.'
- Demetriou, Spyros, Robert Muggah, and Ian Biddle. 2002. *Small Arms Availability, Trade, and Impacts in the Republic of Congo*. Special Report No. 2. Geneva: Small Arms Survey. April. <<http://www.smallarmssurvey.org/fileadmin/docs/C-Special-reports/SAS-SR02-Congo.pdf>>
- Doko, Pascal Azad. 2012. 'Commission d'évaluation des dégâts du drame de Mpila: Les maisons détruites ou endommagées seront reconstruites et réhabilitées.' *La Semaine Africaine*, No. 3181, p. 3. 3 April.
- and Aybienevie N'Kouka-Koudissa. 2012. 'Gilbert Odongo, à propos de l'allocation de soutien aux familles sinistrées: "Il y a autant d'argent disponible qu'il y a des ayants droit".' *La Semaine Africaine*, No. 3181, p. 3. 3 April.
- Dombe Bemba, Ghys Fortune. 2012. 'Le drame du Congo: Une population sacrifiée à Mpila.' 16 March.
<<http://www.mampouya.com/article-le-drame-du-congo-une-population-sacrifiee-a-mpila-101711433.html>>
- EC-ECHO (European Commission—Directorate-General for Humanitarian Aid and Civil Protection). 2012. 'Single Form for Humanitarian Aid Actions: Intermediate Report—Emergency Response to Munitions Depot Explosion in Brazzaville.' Reference No. 2012/00397/IR/01/01. 29 June.
- ECLAC (Economic Commission for Latin America and the Caribbean). 2003. 'Methodological and Conceptual Aspects.' In ECLAC. *Handbook for Estimating the Socio-economic and Environmental Effects of Disasters*, Vol. I. <<http://www.cepal.org/cgi-bin/getProd.asp?xml=/publicaciones/xml/4/12774/P12774.xml&xml=/mexico/tpl-i/p9f.xml&base=/desastres/tpl/top-bottom.xml>>

- EU (European Union). 2013. *Evaluation de l'action de déblaiement et de dépollution des quartiers affectés par l'explosion du dépôt de munitions de Mpila à Brazzaville, en République du Congo: Rapport final*. March.
<<http://www.gichd.org/fileadmin/pdf/evaluations/database/Congo/EvaluationUE-Brazzaville-GICHD-Mars2013-fr.pdf>>
- Gac, Stéphane. 2012. *Mission d'évaluation des risques bâtimentaires faisant suite à la catastrophe du 4 mars 2012 au camp militaire de MPILA à Brazzaville*. Paris: Brigade des sapeurs pompiers de Paris. March.
- Gallo, Martine-Renée and Marc-Éric Gruénais. 1997. 'Fighting for Power in the Congo.' *Le Monde diplomatique*. November.
<<http://mondediplo.com/1997/11/africa2>>
- GICHD (Geneva International Centre for Humanitarian Demining). 2012. *UNMAS Rapid Response Project: Congo Brazzaville Case Study*. September.
- HC (Haut Commissariat pour la Démobilisation et Réinsertion des ex-Combatants). 2013. 'Tableau récapitulatif du processus de désarmement au Congo.'
- HI (Handicap International). 2012. *Amélioration de la sécurité des stocks de munitions et armes légères en République du Congo*. Brazzaville: HI. April.
- IFRC (International Federation of the Red Cross and Red Crescent Societies). 2012. 'Emergency Appeal Operation Update: Republic of Congo—Explosion.'
Emergency appeal No. MDRCG011. Update No. 1. 30 May.
- IMF (International Monetary Fund). 2011. *République du Congo: Cinquième et sixième revues de l'accord triennal au titre de la facilité élargie de crédit et revue des assurances de financement—Rapport des services du FMI*. No. 11/255. August.
- . 2012a. 'Déclaration de la mission du FMI à l'issue des consultations de 2012 au titre de l'article IV.' 23 May.
- . 2012b. *Republic of Congo: 2012 Article IV Consultation—Staff Report; Public Information. Notice on the Executive Board Discussion; and Statement by the Executive Director for the Republic of Congo*. IMF Country Report No. 12/283. October.
- . 2013a. 'Déclaration à l'issue d'une visite des services du FMI en République du Congo.' 16 March.
- . 2013b. 'Une mission du FMI achève les entretiens relatifs aux consultations au titre de l'article IV avec la République du Congo.' Press release No. 13/167. 13 May.
- IRIN (Integrated Regional Information Network for the Great Lakes). 1997. 'Background Brief on Congo-Brazzaville.' 22 October.
<<http://reliefweb.int/report/congo/background-brief-congo-brazzaville>>
- Jeune Afrique*. 2013a. 'Congo-Brazzaville: 6 condamnés et 26 acquittés dans l'affaire des explosions.' 10 September.
<<http://www.jeuneafrique.com/Article/ARTJAWEB20130910151122/congo-brazzaville-mpila-armee-congolaisecongo-brazzaville-6-condamnes-et-26-acquittes-dans-l-affaire-des-explosions.html>>
- . 2013b. 'Le marocain Alliances construit 3 000 logements à Brazzaville.' 22 November.
<<http://economie.jeuneafrique.com/regions/afrique-subsaharienne/20749-le-marocain-alliances-construit-3000-logements-a-brazzaville.html>>
- . 2013c. 'Congo-Brazzaville: arrestation du colonel Ntsourou, une quarantaine de morts dans les affrontements.' 16 December.
<<http://www.jeuneafrique.com/Article/ARTJAWEB20131216124357/denis-sassou-nguesso-brazzaville-congo-brazzaville-jean-dominique-okemba-securite-congo-brazzaville-arrestation-du-colonel-ntsourou-une-quarantaine-de-morts-dans-les-affrontements.html>>
- . 2013d. 'Marcel Ntsourou, le desperado de Brazza.' 26 December. <<http://www.jeuneafrique.com/Article/JA2763p016.xml#0>>
- Lallemand, Alain. 2002. 'The Field Marshall.' Washington, DC: Center for Public Integrity. 15 November.
<<http://www.publicintegrity.org/2002/11/15/5694/field-marshall>>
- La Semaine Africaine*. 2012a. 'Après le drame de Mpila: le manque d'information favorise les rumeurs qui créent la psychose.' No. 3174. 9 March.
- . 2012b. 'Les quartiers sinistrés de Brazzaville seront reconstruits.' No. 3182, p. 3. 6 April.
- . 2012c. 'Des familles divisées sur l'allocation d'urgence de trois millions octroyée aux sinistrés.' No. 3187, p. 6. 27 April.
- Lazarevic, Jasna. 2012. 'Survey Researcher Field Interview Notes, Brazzaville.' Geneva: Small Arms Survey.
- LCMM (Landmine & Cluster Munition Monitor). 2012. 'Congo, Republic of.' 11 October.
<http://www.the-monitor.org/custom/index.php/region_profiles/print_profile/453>
- Le Pape, Marc and Pierre Salignon. 2001. *Une guerre contre les civils: Réflexions sur les pratiques humanitaires au Congo Brazzaville (1998–2000)*. Paris: Karthala.
- Loutoumba, Nancy France. 2012. 'Le 4 mars, un casse-tête pour la République.' *Les Dépêches de Brazzaville*, No. 1572, p. 7. 10 September.
- MAG (Mines Advisory Group). 2012a. 'MAG Assessment of Arms Depot Explosion at Mpila, Brazzaville.' 7 March.
- . 2012b. 'Brazzaville Response: Situation Report 1.' 9 March.
- . 2012c. *Concept Paper: Sub-Clearance & Rubble Removal Response to Mpila Depots Explosion in Brazzaville*. 25 May.
- . 2012d. *Situation Report 7*. June.
- . 2012e. 'Services de dépollution d'urgence dans le quartier de Mpila.' September.
- . 2012f. *Situation Report 10*. September.
- . 2012g. *Rapport narratif final*.

- Moss, Robert. 1977. 'Castro's Secret War Exposed: How Washington Lost Its Nerve and How the Cubans Subdued Angola.' *Sunday Telegraph*. 30 January. <<http://www.rhodesia.nl/moss1.htm>>
- Mouébara, Olivier. 2013. 'Le général Blaise Adoua est-il mort empoisonné?' 17 April. <<http://congo-liberty.com/?p=6107>>
- Muggah, Robert, Philippe Maughan, and Christian Bugnion. 2003. *The Long Shadow of War: Prospects for Disarmament Demobilisation and Reintegration in the Republic of Congo*. A Joint Independent Evaluation for the European Commission, United Nations Development Programme, and the Multi-Country Demobilization and Reintegration Program Secretariat. <<http://www.oecd.org/countries/democraticrepublicofthecongo/35113279.pdf>>
- Muggah, Robert and Ryan Nichols. 2007. *Quoi de neuf sur le front congolais? Evaluation de base sur la circulation des armes légères et de petit calibre en République du Congo*. Special Report No. 8. Geneva: Small Arms Survey and United Nations Development Programme. <<http://www.smallarmssurvey.org/fileadmin/docs/C-Special-reports/SAS-SR08-Congo-Brazzaville.pdf>>
- Nsoni, Joël. 2012a. 'La commission d'enquête passe à la vitesse supérieure!' *La Semaine Africaine*, No. 3181, p. 3. 5 April.
- . 2012b. 'Enquête après le drame de Mpila: Des dizaines d'armes de guerre saisies chez un officier supérieur en garde à vue.' *La Semaine Africaine*, No. 3183, p. 3. 12 April.
- . 2012c. 'Ouverture de la procédure judiciaire au tribunal de grande instance de Brazzaville.' *La Semaine Africaine*, No. 3191, p. 3. 11 May.
- . 2012d. 'Après le drame du 04 mars 2012: L'arrestation du colonel Ntsourou doit-elle entraîner celle de son supérieur hiérarchique, le contre-amiral Jean-Dominique Okemba?' *La Semaine Africaine*, No. 3194, p. 6. 22 May.
- and Cyr Armel Yabbat-Ngo. 2012. 'Après les explosions au camp du regiment blindé de Mpila (Brazzaville): Apocalypse dans les quartiers de Ouenzé et Talangai!' *La Semaine Africaine*, No. 3173, p. 3. 6 March.
- N'Zobo, Rock Euloge and Jean-Gabriel Mavanga Balaka. 2012. 'Explosion du dépôt de munitions de Mpila: conséquence de la négligence des plus hautes autorités du pays.' *La Semaine Africaine*, No. 3174, p. 5. 9 March.
- OCHA (United Nations Office for the Coordination of Humanitarian Affairs). 2012. 'CERF gives \$7 Million to Republic of Congo Following Arms Depot Explosions.' 30 April. <<http://reliefweb.int/report/congo/cerf-gives-7-million-republic-congo-following-arms-depot-explosions>>
- Rawson, John. 2013a. *Explosions in the Ammunition Storage Area in Brazzaville*. Unpublished background paper. 6 May. Geneva: Small Arms Survey.
- . 2013b. 'Notes on Interview with Colonel Oyobé.' 16 January.
- . 2013c. 'Notes on Interview with MAG.' 16 January.
- . 2013d. 'Notes on Interview with Michel Rathqueber (Demeter).' 16 January.
- RFI (Radio France International). 2013. 'Congo-Brazzaville: fin du procès des explosions de Mpila.' 9 September. <<http://www.rfi.fr/afrique/20130909-explosion-mpila-le-proces-est-termine>>
- RoC (Republic of the Congo). 2010. *Report of the Republic of the Congo Concerning the Implementation of the International Instrument to Enable States to Identify and Trace, in a Timely and Reliable Manner, Illicit Small Arms and Light Weapons and of the Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects*. <<http://www.poa-iss.org/CASACountryProfile/PoANationalReports/2010@45@PoA-ITI-RepublicOfTheCongo-2010-E.pdf>>
- . 2012. *Journal officiel*. 54th year, special edn. No. 1. 14 May.
- RoC MoD (Republic of the Congo Ministry of Defence). 2012a. 'Fiche d'information à l'attention du général de division, chef d'état-major adjoint des forces armées congolaises.' No. 00112 /MDN/MID/GAS/CD/SUP. 30 November.
- . 2012b. *Rapport: Deuxième phase de la dépollution de la zone sinistrée suite aux explosions du 04 mars 2012*. No. 00042 /MDN/MID/GAS/CD/SUP. Brazzaville: RoC MoD. 14 May.
- . 2012c. *Rapport sur les opérations de dépollution de la zone sinistrée de Mpila*. 3 September.
- . 2012d. *Rapport sur les opérations de dépollution de la zone sinistrée de Mpila*. 5 September.
- . 2012e. *Rapport d'étape de la phase 3*. No. 00111/MDN/MID/GAS/CD/SUP. 30 November.
- Servenay, David. 2004. 'Confessions d'un marchand d'armes.' RFI. 6 December. <http://www.rfi.fr/actufr/articles/060/article_32274.asp>
- Skilling, Louise. 2013. 'Emergency Response in RoC, Brazzaville, March 2012.' Powerpoint presentation. Mines Advisory Group.
- Small Arms Survey. 2001. 'Fuelling the Flames: Brokers and Transport Agents in the Illicit Arms Trade.' In Small Arms Survey. *Small Arms Survey 2001: Profiling the Problem*. Oxford: Oxford University Press, pp. 94–139. <<http://www.smallarmssurvey.org/fileadmin/docs/A-Yearbook/2001/en/Small-Arms-Survey-2001-Chapter-03-EN.pdf>>
- . n.d. 'Unplanned Explosions at Munitions Sites (UEMS) Database.' Accessed February 2014. Geneva: Small Arms Survey.
- Small Arms Survey and GRIP (Groupe de recherche et d'information sur la paix et la sécurité). 2013a. *The Fight against the Illicit Accumulation and Trafficking of Firearms in Africa: Baseline Study for the African Union and European Union Project—Final Report*. 30 June.
- . 2013b. 'Republic of Congo Mission Report.' In Small Arms Survey and GRIP, pp. 19–31.

- TI (Transparency International). 2013. 'Corruption Perceptions Index 2013.' <<http://www.transparency.org/cpi2013/results>>
- UNDP (United Nations Development Programme). 2013. *Human Development Report 2013—The Rise of the South: Human Progress in a Diverse World*. <<http://hdr.undp.org/en/reports/global/hdr2013/download/>>
- UNGA (United Nations General Assembly). 2008. *Report of the Third Biennial Meeting of States to Consider the Implementation of the Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects*. A/CONF.192/BMS/2008/3 of 20 August. <<http://www.un.org/disarmament/convarms/BMS/bms3/1BMS3Pages/1thirdBMS.html>>
- . 2012. *United Nations Regional Centre for Peace and Disarmament in Africa: Report of the Secretary-General*. A/67/117 of 28 June. <http://www.un.org/ga/search/view_doc.asp?symbol=A/67/117>
- UNMAS (United Nations Mine Action Service). 2012a. 'Briefing Note: UNMAT RoC.' 27 November.
- . 2012b. *Evaluation of the Emergency Mine Action Response to the Ammunition Depot Explosion in Brazzaville, Republic of Congo*.
- . 2012c. 'Weekly Brief: Republic of Congo.' 2–7 April.
- . 2012d. 'Weekly Brief: Republic of Congo.' 9–14 April.
- . 2012e. 'Update Regarding the Mine Action Response in the Republic of Congo.' 7 July.
- . 2013. *IMAS 09_30: Explosive Ordnance Disposal*. Amendment 4. June. <http://www.mineactionstandards.org/fileadmin/user_upload/MAS/documents/imas-international-standards/english/series-09/IMAS-09-30-Ed2-Am4.pdf>
- UNMAT RoC (United Nations Mine Action Team–Republic of the Congo). 2012a. 'Capacity Building Implementation.' 5 November.
- . 2012b. 'Monthly Field Report.' 5 October.
- . 2012c. 'Monthly Field Report.' 3 December.
- . 2013. 'Monthly Field Report.' 4 January.
- UNODA (United Nations Office for Disarmament Affairs). 2011a. *International Ammunition Technical Guidelines (IATG): IATG 01.50 UN Explosive Hazard Classification System and Codes*. <<http://www.un.org/disarmament/convarms/Ammunition/IATG/docs/IATG01.50.pdf>>
- . 2011b. *International Ammunition Technical Guidelines (IATG): IATG 02.20 Quantity and Separation Distances*. <<http://www.un.org/disarmament/convarms/Ammunition/IATG/docs/IATG02.20.pdf>>
- . 2011c. *International Ammunition Technical Guidelines (IATG): IATG 03.10 Inventory Management*. <<http://www.un.org/disarmament/convarms/Ammunition/IATG/docs/IATG03.10.pdf>>
- . 2011d. *International Ammunition Technical Guidelines (IATG): IATG 05.30 Traverses and Barricades*. <<http://www.un.org/disarmament/convarms/Ammunition/IATG/docs/IATG05.30.pdf>>
- . 2011e. *International Ammunition Technical Guidelines (IATG): IATG 07.20 Surveillance and In-service Proof*. <<http://www.un.org/disarmament/convarms/Ammunition/IATG/docs/IATG07.20.pdf>>
- . 2012. *Matching Needs and Resources 2012–2014: Assistance Proposals from Member States Submitted through Their 2012 National Reports under the Programme of Action on the Illicit Trade in Small Arms and Light Weapons*. <<http://www.poa-iss.org/poa/2012-Matching-Needs-and-Resources.pdf>>
- UNSC (United Nations Security Council). 2000. 'Letter Dated 10 March 2000 from the Chairman of the Security Council Committee Established Pursuant to Resolution 864 (1993) Concerning the Situation in Angola Addressed to the President of the Security Council.' S/2000/203 of 10 March 2000. <http://www.un.org/News/dh/latest/angolareport_eng.htm>
- Untitled. 2013. 'Explosions du 4 mars, un an après.'
- Wezeman, Pieter, Siemon Wezeman, and Lucie Béraud-Sudreau. 2011. *Arms Flows to Sub-Saharan Africa*. SIPRI Policy Paper No. 30. Stockholm: Stockholm International Peace Research Institute. <<http://books.sipri.org/files/PP/SIPRI30.pdf>>
- Wezeman, Siemon and Pieter Wezeman. 1998. 'Transfers of Major Conventional Weapons.' In *Stockholm International Peace Research Institute (SIPRI). SIPRI Yearbook 1998: Armaments, Disarmament and International Security*. Oxford: Oxford University Press, ch. 8. <<http://www.sipri.org/research/armaments/transfers/publications/yearbook/CH8YB98>>
- World Bank. 2012a. 'Atelier de formation sur la méthodologie DaLA d'évaluation de catastrophes.' Brazzaville, Congo, 23–27 July 2012.
- . 2012b. 'République du Congo: Aide-mémoire—Mission d'appui à la planification de la reconstruction et à l'amélioration de la prévention.' 9–17 April.
- . 2012c. 'Transmission de l'aide-mémoire de la mission de formation sur la méthode d'évaluation des dommages et des pertes et d'appui à la préparation du document d'évaluation des dommages, des pertes et des besoins de reconstruction de la catastrophe de Mpila.' 10 October.
- . 2014. 'Economy Rankings.' Accessed January 2014. <<http://www.doingbusiness.org/rankings>>
- . n.d. 'Data: Congo, Rep.' Accessed January 2014. <<http://data.worldbank.org/country/congo-republic>>
- Yabbat-Ngo, Cyr Armel. 2012a. 'Obsèques des victimes du drame de Mpila: La République a rendu hommage aux martyrs des explosions du camp du régime blindé.' *La Semaine Africaine*, No. 3175, p. 3. 13 March.

- . 2012b. 'Aide humanitaire: Mettre un terme à la pagaille dans la gestion des sites des sinistrés.' *La Semaine Africaine*, No. 3176, p. 3. 16 March.
- . 2012c. 'Assemblée nationale: Gilbert Ondongo a présenté le projet de budget rectificatif de l'Etat exercice 2012.' *La Semaine Africaine*, No. 3183, p. 3. 12 April.
- . 2012d. 'Assemblée nationale: Pascal Tsaty-Mabiala en faveur du traitement de l'ensemble des sinistres par l'Etat.' *La Semaine Africaine*, No. 3185, p. 3. 20 April.
- Zapata-Marti, Ricardo. 2013. *Estimation of the Costs, Impact, and Consequences (Direct and Indirect) of the Mpila Explosions*. Unpublished background paper. Geneva: Small Arms Survey.

ACKNOWLEDGEMENTS

Principal author

Pierre Gobinet