

# Briefing Paper

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## **LIFE-CYCLE MANAGEMENT OF AMMUNITION (LCMA)**

**Lessons from Bosnia and Herzegovina**

Jovana Carapic and Paul Holtom



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## Front cover photo

Ammunition awaits disposal at TROM Dobož as part of an EU-funded project monitored by UNDP SEESAC.  
Source: UNDP SEESAC

## About the authors

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## Foreword

In 2012, the EUFOR Operational Commander directed the adoption of a comprehensive approach to address the mounting security concerns related to the stockpiling of surplus ammunition remnant from the armed conflict in Bosnia and Herzegovina. After decades of political deadlock driven by the country's conflictual past, the directive empowered a group of experts to design and implement an ammunition life-cycle management system that facilitated a transition to local ownership to address the current and future management challenges in line with international standards. Under the guidance of EUFOR Special Ammunition and Weapons Adviser and the Inter-Agency Strategic Board, this strategy was further developed as a phased eight-pillar Master Plan that fully supported both political and technical coordination requirements through specialized working groups and a dedicated task force embedded within BiH's Joint Staff of its Armed Forces. As the reader will learn in this study, all these elements needed to work in harmony to facilitate complementarity of actions, to coordinate agendas, and, above all, to empower BiH authorities to lead and achieve genuine ownership of the process.

It is therefore, my distinct privilege to present this publication on behalf of my colleagues, both national and international, who are working tirelessly to make Bosnia and Herzegovina a safer country through the effective handling of ammunition.

—**Mihaela Osorio**

Chief Political Adviser to COM EUFOR

Political-military Adviser to the EU Special Representative in BiH, 2011–15

## Overview

This Briefing Paper analyses the emergence of a life-cycle management of ammunition (LCMA) system in Bosnia and Herzegovina (BiH) during the period 2012–16, with reference to four of the five elements of the Small Arms Survey’s LCMA model: national ownership, planning, stockpile management, and disposal. The paper examines the key challenges faced by the international community and BiH government in addressing the safety and security risks posed by BiH’s post-conflict ammunition surplus, focusing on the international community’s role in facilitating the development, and transfer to national ownership, of an LCMA system. The paper notes ‘ten lessons learned’ that could apply to other post-conflict countries. These lessons stress the importance of building sustainable national capacity in states receiving international assistance. Training, infrastructure, and operating standards need to be country specific to achieve this goal and reduce the risk of unplanned explosions at munitions sites (UEMS) and diversion in the long term.

## Key findings

- The experience of BiH demonstrates the importance of prioritizing at an early stage in the post-conflict period: a) the identification and disposal of excessive, unstable, and unsafe ammunition; and b) the establishment of appropriate planning and management processes to ensure the safety and security of such ammunition while in storage. As a first step, international assistance can support a comprehensive inventory of the ammunition stockpile.
- In BiH, international assistance helped foster national ownership of, and build sustainable national capacity for, the implementation of an LCMA system. The BiH government and international community capitalized on the expertise of international organizations and states operating in BiH to deliver tailor-made ammunition management training, equipment, infrastructure, and standards designed not only to reduce the risk of UEMS and diversion but also to build sustainable national capacity for ammunition management.
- The establishment of an LCMA system in BiH has required a high degree of coordination, agreement, and long-term commitment among relevant international partners and BiH government authorities. It has also rested on the development of an Ammunition, Weapons, and Explosives (AWE) Master Plan.

## Introduction

The safe, secure, and sustainable management of conventional ammunition, although essential to public safety and national security, is a complex and costly undertaking. It requires long-term attention by numerous actors to a series of overlapping challenges. These challenges are especially pronounced in post-conflict settings where multiple priorities combined with political, economic, and technical shortcomings can lead to unsafe and insecure stockpile management. This can directly increase the risk of UEMS and the diversion of ammunition.

Recognizing that a systems-based approach is best suited to addressing complex ammunition management challenges, this Briefing Paper uses the Small Arms Survey LCMA model—elaborated in more detail in the forthcoming LCMA Handbook—as a framework for analysing the emergence of an LCMA system in BiH during the period 2013–16 (Bevan and Karp, 2008; UNODA, 2015, mods. 01.30, 03.10; Wilkinson, 2008; see Box 1). It stresses the importance of focusing on ammunition management as a distinct area of concern when considering ammunition, weapons, and explosives (AWE) challenges in post-conflict settings. The paper examines the impact of sociopolitical factors on ammunition management practices in BiH, especially in the context of post-conflict defence sector reform. It also highlights the important role that international assistance can play in facilitating the development of an LCMA system that is owned and sustained by the recipient state.

This Briefing Paper is written for policymakers and programme managers seeking information on the development and implementation of LCMA systems in post-conflict settings and in other countries with limited resources and capacities for ammunition management. The analysis is distilled in the form of ‘ten lessons learned’ from BiH’s experience. The paper draws upon the Small Arms Survey’s previous work in BiH and the Western Balkans as well as desk-based and field research carried out by the authors in 2016 and 2017.<sup>1</sup> It benefited from extensive expert input and support provided by the BiH Ministry of Defence (BiH MoD), the Armed Forces of BiH (AFBiH), and the European Union Force (EUFOR) (see Box 2).

## History of ammunition management in BiH

This section provides a brief history of ammunition management in BiH from the late Yugoslav period until 2011, outlining



### Box 1 Life-cycle Management of Ammunition (LCMA)

Every system has a life cycle, typically consisting of a series of key elements with associated processes and activities that deliver outputs (NATO AAP-48, 2007, p. 34). In the forthcoming LCMA Handbook, the Small Arms Survey identifies the necessary conditions for both the enabling environment and the functional elements of an effective and sustainable LCMA system:

- **National ownership:** National ownership is a prerequisite for an effective LCMA system, providing the following 'enabling conditions': (a) a normative framework for ammunition management; (b) a structural framework for coordination, oversight, and implementation of ammunition management activities; (c) the infrastructure and equipment necessary to manage ammunition across its life cycle; and (d) the human resources necessary for implementation (such as trained technical personnel).
- **Planning:** Effective planning is fundamental to the overall functioning and sustainability of the LCMA system (UNODA, 2015, mods. 01.30, 03.10). Planning seeks to achieve an optimal balance between daily ammunition requirements, mid- to long-term strategic demands, and available financial resources. Good planning determines the quantity and types of ammunition to be procured to fulfil national defence policy, and ensures resources are available to manage, and when necessary dispose of, ammunition.
- **Procurement:** States procure ammunition via national production or import, following demonstration and evaluation to ensure its safety and suitability for service. State control and oversight, record-keeping, and appropriate transportation are of critical importance for the safety and security of the ammunition being acquired.
- **Stockpile management:** This covers many interrelated and complex processes and activities between the entry of ammunition into service and its disposal. This element consists of five components: ammunition storage; ammunition processing, maintenance and repair; stockpile security; and transportation of ammunition.
- **Disposal:** Disposal begins when ammunition is designated unusable, unsafe, obsolete, or surplus to requirements and concludes with the removal of such ammunition from the national stockpile. Such ammunition is disposed of via demilitarization or export. Disposal also involves clean-up after UEMS and the decommissioning of ammunition storage sites (ASS).

Source: Carapic et al. (2018)

BiH's ammunition management challenges for each historical period in light of the following factors: political dynamics and governance structures, conflict legacies, coordination of international assistance, and building capacity for national ownership in a post-conflict setting.

## Ammunition management in SFRY

Yugoslavia's Total National Defence (TND) doctrine of 1968 provided a framework for ammunition management in the Socialist Federal Republic of Yugoslavia (SFRY). It provided for the mobilization of the Yugoslav National Army (YNA), reserves, and Territorial Defence Forces (TDF), the latter consisting of around 2,000 small units organized by commune, factory, and enterprise (Curtis, 1992, p. 252). The TND concept was expected to enable the rapid mobilization of up to three million people (Curtis, 1992, p. 250). To ensure that these forces were able to quickly access arms to defend Yugoslavia against external threats, more than 500 weapons and ammunition storage sites (W/ASS) were dispersed across the country (Kauer,

2007, pp. 83–4). Large quantities of infantry weapons were stored in the Socialist Republic of Bosnia and Herzegovina (SRBiH) for this purpose (Ekwall-Uebelhart and Raevsky, 1995, p. 13).

Yugoslavia imported arms from the Soviet Union and Warsaw Pact states, but also developed an arms industry that produced significant quantities of rifles, machine guns, anti-armour weapons, mortars, and artillery (Wulf, 1993, pp. 387–91). It has been estimated that SRBiH arms factories accounted for 42 per cent of Yugoslavia's military industry output, with several key small arms and ammunition production facilities located in SRBiH (Hirst and Mariani, 2004, pp. 35, 39).

According to one former Yugoslav ammunition technical officer (ATO), Yugoslavia used a combination of French and Soviet ammunition management approaches.<sup>2</sup> Yugoslavia provided a comprehensive four-year academy training programme for ATOs, which covered different ammunition types, storage, and surveillance, and explosive ordnance disposal (EOD).<sup>3</sup> Before the outbreak of conflict in 1992, the territory of SRBiH was covered with well-stocked W/ASS in varying conditions, with experienced

personnel applying ammunition management practices that were in line with relevant international good practice.<sup>4</sup>

## Ammunition management during the conflict period, 1992–95

The disintegration of Yugoslavia had serious repercussions for ammunition management in BiH. The onset of conflict combined with a UN arms embargo, imposed on Yugoslavia's successor states in January 1992, not only led to the proliferation of armed actors on BiH territory, but also to the fragmentation of ammunition management capacities and practices (UNSC, 1992).<sup>5</sup>

The arms embargo initially had little effect on the Bosnian Serb forces, which inherited most of the YNA stockpile in BiH. Bosnian Serb armed forces used familiar ammunition, controlled several production facilities, continued to be trained in Serbia, and maintained former-Yugoslav ammunition management practices.<sup>6</sup> Bosniak and Bosnian Croat forces used former TND W/ASS (Andreas, 2004, p. 35; Carapic, 2014, pp. 2–3). Bosnian Croat forces gained control of production facilities at the beginning of the conflict and by mid-1994, Bosniak and Bosnian Croat forces were producing assault rifles, light weapons, and hand grenades (Bromley, 2007, p. 9). Due to the UN arms embargo, Bosniak and Bosnian Croat forces in BiH relied on arms smuggling from Croatia, former Soviet Republics, and Warsaw Pact states (Andreas, 2004, pp. 39–43; Bromley, 2007, pp. 10–11). The different types of ammunition imported by Bosniak and Bosnian Croat forces created complications for ammunition management in the post-conflict period.

International intervention forces did not directly address ammunition management during the conflict period, nor were they mandated to do so. Even when the United Nations Protection Force's (UNPROFOR) mission expanded from March 1994 onwards to include the monitoring of ceasefires, arms control, and demilitarization arrangements among the warring parties, ammunition management was not explicitly addressed (UNSC, 1994). In particular, UNPROFOR did not attempt to put in place ammunition management measures that could have provided the foundations for an LCMA system in the post-conflict period.<sup>7</sup>

On 14 November 1995, the presidents of BiH, Croatia, and Serbia initialled the General Framework Agreement for Peace in BiH (also known as the Dayton

## Box 2 A note on methodology and terminology

This paper is based on a combination of desk and field research. Desk research involved a review of available information (previous Small Arms Survey publications and unpublished government and international organization documents) pertaining to ammunition management in BiH. Field research—supported by the BiH MoD, the AFBiH, and the EUFOR senior adviser for weapons and ammunition disposal (SAWAD)—used the following methods to obtain insights into the historical evolution of ammunition management in BiH:

- **Key stakeholder interviews:** From May 2016 to March 2017, the research team conducted more than 30 interviews with members of the BiH MoD, the AFBiH, and international organizations operating in BiH. The interviews took place at the MoD and Joint Staff headquarters in Sarajevo; the AFBiH Training and Doctrine Command (TRADOC) in Travnik; the Logistics Command in Doboj; the Personnel Command Banja Luka; and European Union (EU), Organization for Security and Co-operation in Europe (OSCE), and United Nations Development Programme (UNDP) offices in Sarajevo. Interviews with international stakeholders all took place in Sarajevo at their offices.
- **Site visits:** The research team visited the two prospective ammunition storage sites (Kula 1&2 in Mrkonjic Grad, and Krupa in Pazaric) as well as the demilitarization facility in Doboj.
- **Data acquisition:** Relevant information and data pertaining to ammunition management were obtained from the BiH MoD, the AFBiH Joint Staff, and the AWE Task Force.

In line with BiH usage, the following terms are used in this paper when describing the military ammunition stockpile:

- **Prospective:** refers to (a) ASS that will remain as permanent storage sites after disposal of all surplus; and (b) ammunition that meets the operational needs of the AFBiH.
- **Non-prospective:** refers to (a) ASS due to be decommissioned; and (b) unsafe, unstable, or surplus ammunition earmarked for disposal.

The paper also uses the following terms:

- **International community and international partners:** used interchangeably throughout the paper to describe a set of international and regional organizations, as well as states, that historically have been involved in ammunition management and LCMA-related activities in BiH (see Box 4).
- **Demilitarization:** The complete range of processes that render weapons, ammunition, and explosives unfit for its original purpose, including related transport, storage, accounting, and pre-processing operations (UNODA, 2015, mod. 01.40, para. 3.69). It can include destruction through open burning and open detonation (OB/OD).
- **Serviceable ammunition:** Ammunition that meets the minimum technical requirements in terms of serviceability, performance, and operational safety and has been cleared for use (OSCE, 2008, p. 13).

Agreement, 1995). The Dayton Agreement established two main entities for the BiH state—the Federation of Bosnia and Herzegovina (FBiH) and Republika Srpska (RS)—and the autonomous Brcko District. It also created two armies—the Army of the Federation of Bosnia and Herzegovina (Vojska Federacije Bosne i Hercegovine, VF) and the Army of Republika Srpska (Vojska Republike Srpske, VRS)—which were responsible for arms and ammunition management in their respective territories (Morton, 2012, p. 517).

## Ammunition management in the immediate post-conflict period, 1996–2000

The Dayton Agreement recognized the political and military division of BiH. It also provided for arms control and

confidence-building measures to prevent the resumption of conflict (UNSC 1995, Annex 1-B). The North Atlantic Treaty Organization (NATO)-led multinational Implementation Force (IFOR, 1995–6) was mandated to perform, and in fact successfully conducted, a full range of disarmament, demobilization, and reintegration (DDR) activities. IFOR, and subsequently its successor Stabilization Force (SFOR, 1996–2004), had full authority and control over all military activities in BiH. This included monitoring entity W/ASS and ensuring that there would be no unauthorized access to or use of weapons (UNSC, 1995, Annexes 1-A and 2).<sup>8</sup> The Office of the High Representative (OHR) in BiH was given responsibility for overseeing the implementation of the civilian components of the Dayton Agreement.

IFOR and SFOR undertook a quantitative inventory of ammunition and weapons

as part of a process to establish greater control over the stockpile and prevent its use to fuel violence. Neither IFOR nor SFOR were mandated to develop life-cycle management systems for ammunition and weapons (Carapic, Chaudhuri, and Gobinet, 2016, p. 18).<sup>9</sup> SFOR provided guidance on ammunition safe storage, movement, and classification for entity armies (Threat Resolution Limited, 2004, 2-1). IFOR and SFOR also led efforts to regain control over the excessive quantity of ammunition in BiH, including storing or destroying weapons and ammunition collected from civilians (NATO, 2004). Yet these collection efforts, coupled with post-conflict disarmament and demobilization, led to large quantities of ‘unstable ammunition stored in an unsafe way and with inadequate security’ (Hirst and Mariani, 2004, p. 54).

The VF and VRS had different approaches to ammunition procurement in the early post-conflict period, creating different sets of challenges for ammunition management in BiH. From 1995 to 1997, the US-led train and equip programme sourced a diverse range of surplus arms and ammunition from the US and Central and Eastern European states, as well as Brunei, Egypt, Kuwait, Malaysia, Qatar, Saudi Arabia, Turkey, and the United Arab Emirates (Lamb, Arkin, and Scudder, 2014, pp. 23, 26, 30–3). The programme was intended to ensure the defence of the VF and deter a potential attack from the VRS (Lamb, Arkin and Scudder, 2014, p. 14). As a result, in the immediate post-conflict period, the VF had to deal with a significant quantity of different types of ammunition without knowledge of its previous storage history.<sup>10</sup>

The VRS did not face the same challenge as it mainly possessed large quantities of Yugoslav-produced ammunition.<sup>11</sup> Both entity armies also had significant quantities of ammunition produced during the war. The disparities in training and experience, combined with the large quantity of old and potentially unstable ammunition in post-conflict BiH, presented both entity governments and the international community with security and safety concerns that would take more than 20 years to address.

## SSR and ammunition management in BiH, 2000–04

The immediate post-conflict period was characterized by efforts to exercise basic control of ammunition and weapon stockpiles in BiH, kept more or less intact in order to deter conflict. By 2000, the focus



A cannon shell is cut as part of the surplus ammunition destruction process in Doboj, February 2015. Source: Amel Emric/AP Photo

## Towards stabilization, 2005–11

In December 2004, EUFOR Operation ALTHEA replaced the NATO-led SFOR and took over the executive mandate to oversee the military implementation of the Dayton Agreement (UNSC, 2004). Operation ALTHEA oversaw the shift from a reactive ‘crisis’ phase towards gradually increasing the focus on training and capacity building designed to foster national ownership of arms and ammunition control. For example, an international stakeholder expert working group (EWG), made up of international organizations working on arms control issues, was established in 2006 to: a) provide advice to BiH authorities on arms control and management; b) develop MoD and AFBiH capacity to store and dispose of surplus ammunition and weapons; and c) coordinate related activities of the international community (EWG, 2010b, p. 4).<sup>14</sup> The EWG, however, struggled to effectively coordinate international activities during the period 2006–11 because there was no coordination body with decision-making power and the group met on an ad hoc basis.<sup>15</sup>

The AFBiH and BiH MoD were established during this period, with significant international input. The *Law on Defence* merged the two entity armies into national armed forces under a single BiH MoD (BiH Government, 2005). When the AFBiH was officially formed in 2006, it was to consist of 16,000 personnel (10,000 military personnel, 5,000 reservists, and 1,000

had switched towards military downsizing and the identification and disposal of surplus. The OHR in BiH placed disposal of surplus ammunition at the ‘top of the criteria priority list’ in the early 2000s (Threat Resolution Limited, 2004, 1-A-6). The downsizing of both entity armies from 430,000 troops in 1995 to 33,600 in 2004 created a significant quantity of surplus ammunition. The downsizing was part of military reforms initiated at the turn of the millennium, which NATO linked to possible Partnership for Peace (PfP) status and NATO membership for BiH.<sup>12</sup>

The OHR, NATO, and other international partners directed the military reforms of the early-2000s, including efforts to tackle the excessive quantities of ammunition in BiH. Tackling the problem of surplus ammunition in BiH during this period was made more difficult by the complicated governance structure established by Dayton, and divergent political agendas that stalled defence reform. For example, some entity-level political elites opposed the establishment of a single, national Ministry of Defence (MoD), despite the fact that this was regarded as necessary for strategic oversight and effective management of the military stockpile.

In 2004, an assessment of BiH’s ammunition management capacities identified only limited numbers of military personnel with ammunition management training and experience, mainly in the VRS (Threat Resolution Limited, 2004, 7-2). The assessment concluded that the ‘ammunition stockpile presents a genuine and current threat to the civilian population living nearby’ due to its age and storage conditions, inadequate security, limited surveillance of ammunition stability, and the excessive net explosive quantities (NEQ) of ammunition inside the store houses (Threat Resolution Limited, 2004, 2-1-5; see Box 3).

In 2004, SFOR estimated that almost half of BiH’s total ammunition stockpile of 137,760 tonnes required immediate disposal (Threat Resolution Limited, 2004, 1-A-1). The number of ASS (including field storage sites) was reduced from 540 in 1999 to 42 in 2004, requiring a significant increase in the rate of disposal of surplus ammunition (UNDP SEESAC, 2005, p. 48). BiH authorities favoured disposal via export sales, as stockpiles were regarded as assets rather than liabilities. The international community, however, prioritized disposal by demilitarization, followed by donation.<sup>13</sup> The divergence of opinion regarding the mode of disposal continues to be a point of contention among some international actors and national authorities in BiH.

### Box 3 UEMS in Bosnia and Herzegovina

The Small Arms Survey’s Unplanned Explosions at Munitions Sites (UEMS) Database has registered more than 579 UEMS explosions at munitions sites across the globe since 1979, recording three explosions at ASS in BiH during the period 1979–2018 (Small Arms Survey, n.d.; see Table 1). The exact causes of these explosions have not been publicly announced. AFBiH personnel informed the research team that negligence during the handling of ammunition caused the incident at Rudo in 1999. Since the formation of the AFBiH in 2006, there have been no UEMS incidents in BiH. However, international ammunition specialists working in BiH have voiced their concern that the continued dire state of ammunition storage conditions at non-prospective sites, and the large quantity of aging ammunition, create fertile conditions for UEMS to occur (Carapic, 2017, p. 67).

**Table 1** UEMS incidents in BiH, 1979–2018\*

Year	Location	Owner/manager	Deaths	Injuries
6.10.1999	Rudo	state (military)	3	0
-- --.2000	Bihac	state (military)	n/a	n/a
20.06.2003	Rabic	state (military)	2	0

\* Note: ‘n/a’ means that data is either unavailable or unrecorded. Double dashes (--) in dates indicate that precise dates are unavailable.

Source: Small Arms Survey (n.d.)





civilians) (BiH MoD, 2006b). The *Law on Defence* also transferred the rights, responsibilities, and obligations of the entities with regards to ‘moveable military property’, which includes ammunition, to the national level. The law also stipulated that BiH would have a maximum of five ASS. The law was followed in 2006 by the *BiH Presidency Decision on the Size, Force Structure, and Locations of the AFBiH* and the *MoD BiH Decision on Armaments, Weapons Systems, and Equipment* which determined the types of arms and ammunition that were to be considered ‘non-prospective’, and therefore surplus to requirements, for the AFBiH.

In 2006, the BiH MoD identified 35,000 tonnes of surplus ammunition, mines, and other explosive devices (Hadzovic, Krzalic, and Mihajlovic, 2011, p. 60). This estimate was made before a comprehensive inventory of the ammunition stockpile had taken place. The lack of information on the condition of ammunition in the stockpile meant that the AFBiH did not know if the ‘prospective’ ammunition (that is, ammunition meeting operational needs) could be used or if it was surplus only fit for demilitarization. At this time, planning focused on the management of the ammunition stockpile and the disposal of surplus, with no reference to ammunition procurement.

From 2005 to 2008, a normative framework (legislation and institutional procedures) was established to address the challenges posed by the significant quantity of surplus ammunition in BiH. The *MoD BiH Policy to Resolve Surplus Armaments and Ammunition* of 2007 ranked methods of disposal from most to least preferred as sale, donation, and demilitarization. The BiH authorities determined that export sales were the ‘fastest, most cost-effective means of disposal’ (BiH Government, 2008; 2009a; 2009b). The policy was followed in 2008

by the Dobo Agreement, which established the practical modalities for the transfer of all ‘moveable defence property’ to the national level, as well as the identification and disposal of surplus.<sup>16</sup> From the outset, there were different interpretations of the provisions of the Dobo Agreement regarding the disposal of surplus, especially of scrap salvage material. Entity governments were reportedly concerned that they would see little financial return from this material once the MoD subtracted the costs of processing and selling it. This dispute has been cited as a key factor in slowing the pace of ammunition disposal during the past decade.<sup>17</sup>

The international community continued to highlight the safety and security risks posed by the surplus stockpile during this period (see Table 2). The EWG recom-

**Table 2** Selected cases of diversion of surplus ammunition and weapons in BiH, 2009–2013

Year	Description of incident
2009	About 8,500 rounds of ammunition and hand grenades disappear from the ASS in Busovaci.
2011	Alleged disappearance of 11 tonnes of TNT explosives from sites guarded by the AFBiH.
2011	47 pistols go missing at the WSS ‘TBT’ in Visoko, the value of which is estimated at BAM 84,600. Independent observers report that some breechblocks are also stolen from among the artillery pieces stored at the site.
2013	Disappearance of a Fagot anti-tank guided missile from the ASS Kula 2, in Mrkonjic Grad.

Sources: Azinovic, et al. (2012, pp. 101–2); CIN (2013); Doznajemo (2013); Filipovic (2011); Klix (2013)

mended the demilitarization of unsafe ammunition, as well as measures to develop and strengthen AFBiH stockpile management and disposal capacities (Carapic, Chaudhuri, and Gobinet, 2016; EUFOR Sa, 2013, p. 2). Despite repeated calls by the international community to increase the rate of surplus ammunition demilitarization, official BiH data indicates that between 2010 and 2012 the quantity of ammunition demilitarized annually decreased from 1,420 tonnes in 2010 to 850 tonnes in 2012 (see Figure 2).

From 2010 to 2012, international assessments highlighted the dire state of BiH’s ammunition stockpile, management infrastructure, and practices. The international community consequently moved to identify a range of activities that could be carried out in cooperation with BiH to improve stockpile management infrastructure and practices in BiH (see Boxes 4 and 5).

## LCMA in BiH: lessons learned

This section uses the Survey’s LCMA framework to identify ten lessons learned from the establishment of an LCMA system in BiH during the period 2012–16 that may be relevant to other international interventions to address AWE challenges in post-conflict settings. The first two lessons concern the initial steps that were taken to support national ownership of an LCMA system in post-conflict BiH. The subsequent lessons relate to LCMA planning (two lessons), stockpile management (three lessons), and surplus disposal (three lessons).<sup>18</sup> Box 4 summarizes the key steps in the process of establishing an LCMA system in BiH.

### National ownership of an LCMA system

#### Lesson 1. National ownership is fundamental for effective LCMA

A sustainable LCMA system is only possible if national governmental institutions assume ownership and responsibility for ammunition management. While the international community substituted expertise for a lack of national capacity in post-conflict BiH until 2012, it subsequently built government capacity to ensure its ownership of the LCMA system. The EUFOR ‘Ammunition and Weapon Storage Site Management’ Mobile Training Team (MTT Project) played a key role in this process,

#### Box 4 Key steps in the establishment of the LCMA system in BiH, 2010–16

- **August 2010:** Multinational stockpile assessment visits carried out under the OSCE umbrella.
- **December 2010–March 2011:** BiH MoD requests assistance from the OSCE to upgrade security and infrastructure at the prospective W/ASS. OSCE project SECUP (Security Upgrade of Ammunition and Weapon Storage Sites in BiH) begins in October 2013.
- **November 2011:** BiH MoD requests UNDP BiH support to destroy surplus ammunition. UNDP project EXPLODE (Explosive Ordnance and Remnants of War Destruction in BiH) starts in January 2013.
- **January–November 2012:** EUFOR operation commander undertakes consultations to develop a comprehensive strategy to address the AWE stockpile.
- **February 2012:** BiH MoD approves the *Plan for Resolving Surplus of Moveable Military Property*.
- **November 2012:** International community endorses *Non-paper on Surplus Ammunition and Weapons in BiH*.
- **February 2013:** EUFOR Operations Commander approves AWE Master Plan.
- **April 2013:** BiH MoD approves AWE Master Plan. Creation of the EUFOR SAWAD position.
- **July–September 2013:** Coordinating infrastructure to support implementation of the AWE Master Plan put in place (Strategic Board, Coordination Board, and working groups established). The ‘100 per cent inventory’ of BiH’s ammunition stockpile begins.
- **April–May 2014:** BiH authorities take greater ownership over the LCMA process, with the creation of the AWE Task Force and the TRADOC ‘Ammunition and Explosive Ordnance Storage Management Training Cell’.
- **January–December 2015:** BiH government streamlines decision-making for approving unsafe and unstable ammunition for destruction.
- **September 2016:** MoD BiH requests OSCE assistance to strengthen W/ASS infrastructure and security. OSCE seeks funding from the SAFE-UP Project (Safety and Security Upgrade of Ammunition and Weapon Storage Sites in BiH) for this initiative.

following its establishment in December 2010.<sup>19</sup> Since then, the MTT Project has:

- Provided needs-based, tailor-made, modular ammunition management training courses which the BiH MoD subsequently integrated into AFBiH TRADOC structures and curriculums;<sup>20</sup>
- Coordinated equipment donations for stockpile management capacity-building and training efforts; and
- Provided advice to the BiH MoD and the AFBiH for sustainable LCMA, particularly the development of regulations and standard operating procedures (SOPs) for stockpile management, including ammunition accounting and disposal (SAWAD, 2016; Carapic, Chaudhuri, and Gobinet, 2016, pp. 21).

Since 2012, the international community has also encouraged high-ranking BiH MoD and AFBiH personnel, including the minister of defence and chief of defence, to take a more prominent role in addressing the challenges posed by the ammunition stockpile. The international community has engaged these individuals through regular formal and informal meetings and briefings on the plans, progress, and challenges associated with ammunition management. As a result of these efforts, high-ranking BiH MoD and AFBiH personnel are now taking

the lead in related decision-making and planning, including through the development and implementation of the AWE Master Plan.

#### Lesson 2. The coordinated, long-term commitment of international partners is essential for the establishment of LCMA in a post-conflict setting

Prior to 2013, there was a lack of coordination, communication, and information sharing between international and regional organizations, states, and NGOs working to address BiH’s ammunition stockpile challenges. The lack of an effective mechanism to coordinate international assistance, for example, hampered the division of labour and the efficient use of resources.<sup>21</sup>

To address these issues, the EUFOR operation commander initiated consultations in 2012 that contributed to the development of the comprehensive strategy contained in the *Non-paper on Surplus Ammunition and Weapons in BiH* (Non-Paper, 2012). Under this strategy, all key international stakeholders committed to providing expertise and resources in a complementary and coordinated way to help the BiH MoD and the AFBiH address the challenges posed by the AWE stockpile (Non-Paper, 2012, p. 1; see Box 5). By the end of 2012, thanks to the non-

paper, the international community had streamlined its efforts on how to address BiH’s ammunition stockpile challenges.<sup>22</sup>

It was not easy to secure the agreement of all key international stakeholders. One interviewee stressed that a key factor for success was the support and engagement of EUFOR’s commander, EU political representatives, and the defence attaché community in BiH.<sup>23</sup> A small number of individuals possessed the necessary knowledge of AWE stockpile management, the socio-political situation in BiH, and the necessary diplomatic skills to successfully lobby for a coordinated and sustainable international response to BiH’s AWE stockpile challenges, and to secure the necessary cooperation from BiH’s defence and political elites.<sup>24</sup>

These individuals also played a key role in securing agreement on how to implement the strategy, specifically in the form of the AWE Master Plan, which includes both an Ammunition Master Plan (AMP) and a Weapons Master Plan (WMP).<sup>25</sup> This Briefing Paper focuses on the AMP, which coordinated ammunition management activities in BiH from 2013 to 2016 and defined the division of labour and resources needed to build national capacity for LCMA.

## Planning

### Lesson 3. Implementing effective LCMA in a post-conflict setting requires early agreement on overall objectives, specific priorities, and resource requirements

During the first quarter of 2013, the international community convened a task force consisting of key international and BiH stakeholders to develop the AWE Master Plan. The task force engaged defined the desired end state for addressing AWE challenges as ‘the transparent disposal of surplus ammunition and weapons and the introduction of a sustainable ammunition and weapons life-cycle management system in BiH’ (EUFOR Sa, 2013, p. 2).<sup>27</sup> The AWE Master Plan identified priority areas for addressing the ammunition challenge in BiH, which later formed the eight pillars of the AWE Master Plan: security, export (donations and sale), capacity building and training, organizational structure, normative development, safety, inventory management, and demilitarization and destruction (SAWAD, 2016; see also Boxes 6 and 7). The areas to be addressed were in line with both BiH small arms and light weapons (SALW) Control Strategies



### Box 5 International efforts in support of the AWE Master Plan, 2013–16

Either an international or regional organization led the implementation of the following six pillars of the AWE Master Plan during the period 2013–16. All implementation activities discussed below were conducted in collaboration with other international partners and the BiH government:

- **Normative development:** NATO and EUFOR took the lead in advising the MoD and the AFBiH on the development of national laws, regulations, and SOPs for ammunition management.
- **Security:** The OSCE led work to upgrade the security of W/ASS in BiH during 2013–16, primarily via the SECUP project (OSCE BiH, n.d., p. 1).
- **Safety:** UNDP BiH supported national efforts to reduce the risk of UEMS and increase public safety during 2013–16 via the EU-funded EXPLODE Project (UNDP, n.d.).
- **Capacity building and training:** The EUFOR MTT Project—composed of Switzerland, Austria, and Sweden—led stockpile management capacity-building and training activities (for more details see Carapic, Chaudhuri, and Gobinet, 2016). Capacity-building and training activities were also carried out by UNDP BiH under the EXPLODE Project.
- **Demilitarization and destruction:** UNDP led on demilitarization issues during 2013–16, with a focus on ammunition demilitarization at the TROM Dobož facility. Sterling Global Operations Inc., with the support of the US State Department, led on OB/OD destruction activities carried out at the Glanda Brda range in Glamoc.
- **Export:** UNDP, with the support of the Swiss government, has explored the potential disposal of surplus BiH ammunition through export in accordance with BiH's obligations under the Arms Trade Treaty (ATT).<sup>26</sup> From 2015 to 2017, the Small Arms Survey conducted an analysis of BiH's stockpiles and regulatory framework to support this work (Carapic, 2017; Parker, 2016).

Source: SAWAD (2016)

(2013–16 and 2016–20) and are to be implemented between 2013 and 2018.<sup>28</sup>

In line with Lessons 1 and 2, the task force engaged all relevant international and BiH government stakeholders in the preparation of the AWE Master Plan. EUFOR organized an AWE workshop in February 2013 to secure the agreement of the international community on the objectives, priority areas, and activities it would support—in particular, capacity building and training, normative development, and coordination and organization—before presenting the plan to the BiH government. The AWE Master Plan provided clarity on the international community's capacities, resources, and potential contributions in addressing BiH's AWE challenges. It also defined the roles and responsibilities of the different international actors, the BiH MoD, and the AFBiH. The AWE Master Plan was formally approved by the EUFOR operational commander in February 2013 and by the BiH MoD in April 2013 (SAF, 2013a, p. 4; 2013b).

This rapid approval was made possible by the international community's coordinated approach to the AWE challenges in BiH (see Lesson 2). National ownership, equally crucial (Lesson 1), was reflected through the BiH government's development of concrete plans, based on the AWE Master Plan, to address specific AWE challenges. While the international community led the development of the

AWE Master Plan, BiH stakeholders were involved in defining the agreed end state and developing concrete steps to achieve

this goal. Thus, the international community and key BiH stakeholders agreed on overall objectives, priorities, and resources for transferring ownership over ammunition management to the BiH authorities.

### Lesson 4. Sustainable LCMA requires robust organizational structures and appropriate personnel

The AWE Master Plan defined the organizational structure required to support the programmes and activities for the transparent disposal of surplus ammunition and the implementation of sustainable LCMA (SAF, 2013b, p. 4; OSCE, 2014, p. 33; see Box 6). This organizational structure supported the AWE Master Plan in the following ways:

- Through the effective and efficient coordination of national and international activities;
- By building confidence among all key stakeholders via regular interaction; and
- By defining the roles and responsibilities of, and consequently empowering, BiH authorities and senior leaders within international organizations to implement the Master Plan.

### Box 6 AWE Master Plan Organizational Structure

The **Strategic Committee** is the politico-military decision-making body for the implementation of the AWE Master Plan. The BiH minister of defence heads the committee, which is also composed of high-level representatives from the BiH MoD, the AFBiH, and key international partners. It meets up to four times a year.

The **Coordination Board** is responsible for coordinating, synchronizing, and prioritizing AWE Master Plan activities and oversees the working groups. It is led by the MoD BiH deputy chief of the Joint Staff for Resources and consists of project managers from the BiH government and international partners. The board meets up to six times a year.

There are three specialized **Working Groups** for LCMA in BiH:

- Working Group Krupa 2017 is responsible for the development of SOPs, personnel training, and infrastructure and equipment upgrades for the ASS Krupa;
- Working Group TROM Dobož is concerned with all aspects of ammunition disposal, as well as the development of surveillance and maintenance activities, at the military demilitarization site in Dobož;
- Working Group Glamoc focuses on improving capabilities for OD/OB destruction operations at the Barbara site in Glamoc. It also identifies potential alternative sites in BiH and explores the possibility of utilizing destruction ranges for ammunition (and weapons) proofing and ballistic testing.

The **AWE Task Force** is a 'formal but temporary' organization within the AFBiH Joint Staff. It serves as a point of contact between the international partners and the MoD and AFBiH and is an information repository for all AWE management issues (AFBiH AWE, 2014).

The key international organizations and actors involved in the implementation of the AWE Master Plan regularly coordinate their activities. Each organization plans and implements individual projects and activities.

Source: Carapic, Chaudhuri, and Gobinet (2016, pp. 38–41)

An associated lesson is the need to place appropriately experienced, skilled, and motivated personnel in key positions to ensure that the organizational structure delivers the desired changes. A critical factor in the case of BiH was the EUFOR commander's decision to create the position of senior adviser for weapons and ammunition disposal (SAWAD) in April 2013. The SAWAD has influence over decision making, oversees implementation, and ensures the overall coordination of Master Plan activities. This individual reports to the commander of EUFOR, but advises the BiH MoD and AF BiH on matters relating to the Master Plan.<sup>29</sup> The SAWAD can convene key stakeholder meetings, engage in fundraising efforts, set deadlines, and advise national and international stakeholders on how to achieve agreed goals.

Unlike other EUFOR personnel, the SAWAD is not subject to rotation. This is a long-term position, allowing the SAWAD to engage in the confidence building necessary for the successful implementation of LCMA activities. Since its creation in 2013, the SAWAD position has been filled by a high-ranking Swiss military officer, who is also the senior project manager for the MTT Project and has expertise in life-cycle management systems. The SAWAD is responsible for the design and implementation of AWE Master Plan activities, including capacity building and training, and is supported by an assistant, a position that since its inception in 2013 has been filled by Austrian officers with expertise in logistics, and weapons and ammunition management.

## Stockpile Management

### Lesson 5. Successful LCMA rests on a comprehensive inventory of the ammunition stockpile

The 2012 non-paper recommended that BiH conduct a comprehensive inventory of its ammunition stockpile, create a single national ammunition list, and establish a national inventory management system (Non-paper, 2012, p. 3). SFOR/EUFOR and each entity maintained their own book-keeping systems. The entities were also reluctant to countenance a comprehensive national inventory because of fears that this could hamper their efforts to sell surplus ammunition.<sup>30</sup> Therefore, the international community engaged 'key leaders' via several round tables to stress the importance of conducting a '100 per cent inventory' of the national ammunition

**Table 3** Progress of '100 per cent inventory', 2013–16

Year	Tonnes	Rounds
2013	740	2,025,428
2014	2,736	20,516,964
2015	5,447	28,569,126
2016	5,898	38,538,783
<b>Total inspected</b>	<b>14,821</b>	<b>89,650,301</b>

Source: BiH MoD (2017)

stockpile, which would enable the creation of a single national inventory list (SAF, 2013, p. 3). This would also facilitate good storage practices and the implementation of an effective surveillance system (see Lesson 6). The AWE Master Plan also sought to assuage concerns regarding the potential impact on sales, emphasizing that the '100 per cent inventory' would help to determine which ammunition could be sold (EUFOR Sa 2013, p. 8). These efforts led to the BiH minister of defence ordering a '100 per cent inventory' of all BiH ammunition and weapon stockpiles in 2013 (BiH MoD, 2014c).

BiH's limited capacity made it difficult to conduct the '100 per cent inventory' in an effective and timely manner. The first step in this process was the provision of training by the international community. During the period 2012–13, AFBiH personnel received training in basic ammunition handling, testing, storage, LCMA regulations and SOPs, and inventory management (EUFOR Sa, 2013, p. 9). The AFBiH began the '100 per cent inventory'

### Box 7 The benefits of the '100 per cent inventory' (Lessons 5 and 6)

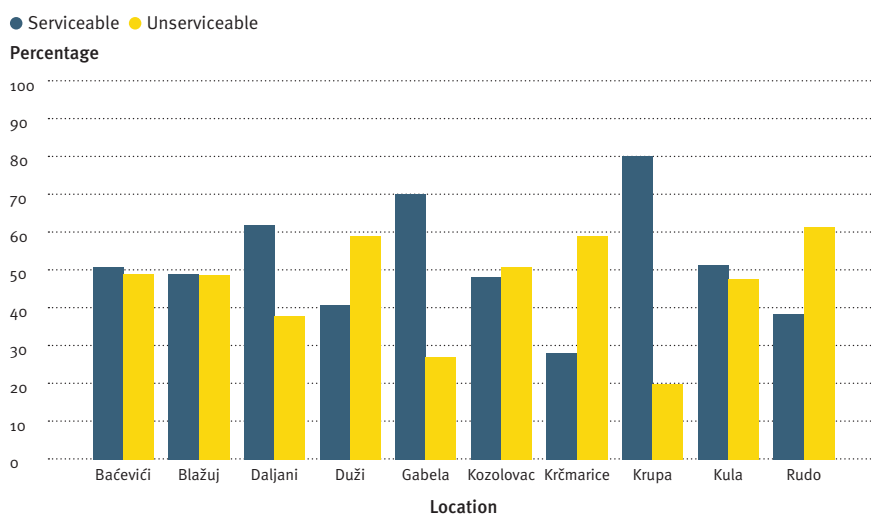
'The 100 per cent inventory is the most important part [of establishing an LCMA system] because if you don't know what you have, and in which condition it is, nothing else works.'<sup>33</sup>

The '100 per cent inventory' includes quantitative and qualitative dimensions that involve the following activities and achievements:

1. A complete stock-check of the ammunition stockpile, according to type, quantity, batch/lot number, and location;
2. A technical analysis of the condition of ammunition by visual inspection and limited QPAK testing;
3. Identification and rapid removal of unsafe and unserviceable ammunition from ASS, thus strengthening stockpile management and contributing to the establishment of a future surveillance system;
4. A gradual reduction in the number of ASS, enabling the implementation of appropriate safe and secure storage practices at the remaining locations; and
5. The creation of a definitive 'sales list', essential for a transparent surplus disposal process.

in 2013. By the end of 2016, about 14,820 tonnes of ammunition and nearly 89.7 million rounds had been inspected: 77 per cent of the military stockpile in 2016

**Figure 1** Distribution of serviceable and unserviceable ammunition across location: technical inspection results (2015–16)\*



Note: \*Data for 2016 is as of 30 September that year.

Source: BiH MoD (2016)

(MoD BiH, 2016; see Table 3). The ‘100 per cent inventory’ is expected to be finished in 2018. Box 7 summarizes the benefits of a ‘100 per cent inventory’ for effective LCMA in a post-conflict setting.

## Lesson 6. Stockpile safety depends on an assessment of the condition of stored ammunition

A key component of effective LCMA—and more specifically of the ‘100 per cent inventory’ referred to above—is the ability to determine the physical condition, chemical stability, and hazard classification of ammunition in the national stockpile (UNODA, 2015, mod. 07.20, para. 4). The AWE Master Plan concluded that the establishment and implementation of an ammunition surveillance system could only be achieved in BiH over the long term (EUFOR Sa, 2013, p. 4). Nevertheless, the large quantity of old, unsafe, and improperly stored ammunition in ASS across BiH posed an acute threat to the safety and security of AFBiH personnel and civilians. According to one high-ranking AFBiH representative, a decision had to be made:

‘Either we could wait to be able to implement a systemic surveillance system and take the risk that an explosion would occur, or we could start the process already and start solving the problems posed by the ammunition stockpile one at a time and coordinate with all relevant national and international stakeholders.’<sup>31</sup>

Therefore, with the support of the international community, the BiH MoD decided to undertake, as part of the ‘100 per cent inventory’ mentioned in Lesson 5:

- A stock-check of the entire ammunition stockpile;
- A visual technical inspection of all the ammunition; and
- Chemical testing of propellant, using quick propellant analysis kits (QPAK) provided by the Austrian component of the MTT Project (BiH MoD, 2014c).

Based on this analysis, 43 per cent of the ammunition visually inspected in 2016 was deemed unserviceable and therefore needing to be disposed of. Figure 1 shows the results of such inspections at ten ASS during the period 2015–16. The QPAK testing of 219 samples of ammunition identified as serviceable by visual inspection determined that while only 7 per cent of this ammunition was unstable, 62 per cent was stable only for the next

two years, and 28 per cent for the next four years.<sup>32</sup> This assessment has helped to mitigate the UEMS risk and contribute to the reduction of the stockpile.

The assessment also laid the foundations for the medium-term development of an ammunition surveillance system in BiH. For example, sampling and conducting rudimentary surveillance procedures provides AFBiH personnel with experience that could be developed into a fully-fledged surveillance and in-service proof system. At the end of 2016, the OSCE project SAFE-UP determined that the time was right to seek international assistance to establish a chemical testing laboratory at the demilitarization laboratory in TROM Dobož, making a further, potentially important contribution to the establishment of an effective LCMA system in BiH (see Box 7).

## Lesson 7. Adequate resources and capacities are needed for a safe and secure ammunition stockpile

Effective stockpile management involves the safe and secure storage, transportation, and handling of ammunition (UNODA, 2015, mod. 01.40, para. 3.275). Yet the full implementation of international best practices in stockpile management across all prospective ASS exceeds the efforts deployed to date by the international community in support of the AWE Master Plan (2013–18).<sup>34</sup> This remains a medium- to long-term goal for the BiH authorities.

In accordance with BiH’s *Law on Defence* and the future operational requirements of the AFBiH, the OSCE SECUP and UNDP EXPLODE projects concentrated on ensuring adequate safety and security standards for two ASS in BiH—Kula 1&2 and Krupa—as well as the Dobož demilitarization facility. These sites provided a basic safety and security infrastructure that could be upgraded, rather than having to be rebuilt. They also had sufficient space to house the required ammunition for the medium to long term. Project standards were such that they

could be sustained over the medium term by the AFBiH (OSCE, 2016; SAWAD, 2016). These infrastructure upgrades, as well as donations of equipment and training provided by the EUFOR MTT Project troop-contributing nations, help to mitigate ASS security and safety risks and progressively enable national ownership (SAWAD, 2016). They also reflect good coordination between BiH and its international partners (SAF, 2012, pp. 12–13) and help BiH move towards compliance with the highest standards for stockpile management and security (see UNODA, 2015, mod. 09.10; UN CASA, 2012).

## Disposal

### Lesson 8. Effective and efficient surplus disposal requires adequate normative and institutional frameworks, as well as the necessary political will

Despite clear normative and institutional frameworks for disposal, the rate of ammunition disposal in BiH was in decline in the months preceding the drafting of the AWE Master Plan in 2013 (see Figure 2).<sup>35</sup> As noted above, ammunition disposal was a politically sensitive issue. More specifically, presidential approval was required for any form of disposal, even when unsafe ammunition needed to be immediately destroyed.<sup>36</sup> Speeding up authorization of the disposal of unsafe ammunition was therefore a priority for implementation of the Master Plan.

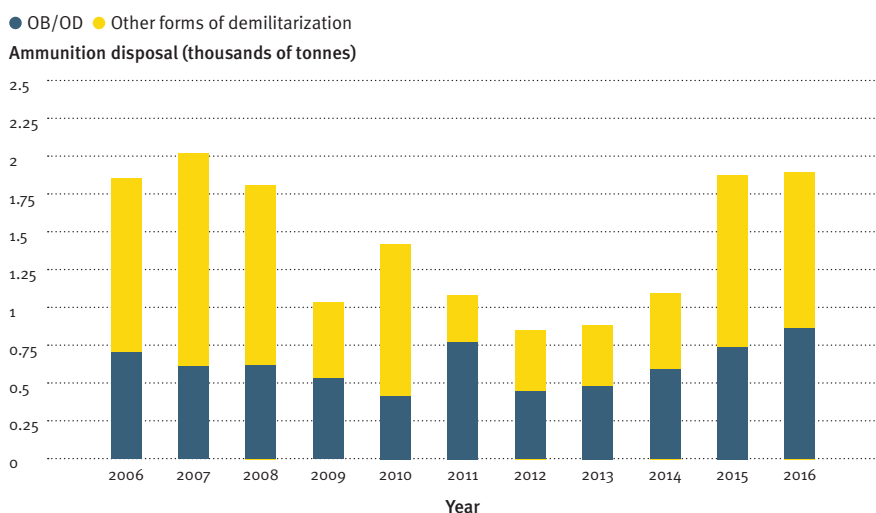
While presidential approval is still required for ammunition destruction, the process for authorization is now more efficient and approval is granted more quickly than in the past. In addition, the MoD can carry out ‘emergency’ destruction of unsafe ammunition without specific presidential authorization. The reduction in the time taken for the presidential approval led to a significant increase in the ammunition disposal rate during the period 2015–16 (see Figure 2).<sup>37</sup>



Photos showing an ammunition storage site in Kula before and after its refurbishment conducted in the framework of the EXPLODE project and UNDP SEESAC’s security upgrades. Source: Jasmin Porobic



**Figure 2** Disposal of ammunition in BiH using OB/OD and other forms of demilitarization, 2006–16



Source: BiH MoD (2017)

Despite the stated preference of the BiH authorities for the disposal of surplus through export (BiH government, 2008; 2009a; 2009b), demilitarization, including destruction, continues to be the primary mode of disposal for unsafe and surplus ammunition in the country. International stakeholders have facilitated the demilitarization and destruction process by increasing the capacity and skills of AFBiH personnel and employing independent contractors at the TROM Dobož demilitarization facility and the Glamoc range.<sup>38</sup> The improved coordination between the BiH government and its international partners since the adoption of the AWE Master Plan may also have contributed to the increased rate of demilitarization since 2012 (see Figure 2).

### Lesson 9. Serviceable but surplus ammunition may be disposed of through export sales authorized in conformity with a country’s international commitments

Prior to 2013, international partners and key BiH stakeholders had divergent views regarding the export of surplus ammunition, including scrap material resulting from demilitarization:

- The BiH government and MoD considered export sales of surplus ammunition as the fastest and most cost-effective means of disposal (BiH Government, 2008; 2009a; 2009b);
- Entity-level political authorities questioned the MoD’s authority and ability to export surplus, even though this is

authorized under the the Dobož Agreement; and

- The international community preferred that surplus be disposed of by demilitarization.<sup>39</sup>

With the development of the Master Plan, stakeholders have come to accept export sales as a valid method for the disposal of surplus if carried out by national authorities in accordance with international standards, such as those of the ATT (EUFOR Sa, 2013, p. 8). Several independent assessments have concluded that BiH’s legislation and administrative procedures for the export of arms, ammunition, and military equipment meet such standards (Parker, 2016; Kytömäki, 2016). The BiH MoD has developed administrative guidance for the disposal of surplus by export in the 2012 *Plan for Resolving Surplus* (BiH MoD, 2012).

Several people interviewed for this study claimed that because of unresolved issues pertaining to contracts concluded by entity governments prior to the formation of the BiH MoD and the AFBiH, the moratorium of 2004–05 on the sale of surplus ammunition remains in effect.<sup>40</sup> Others indicated that the sale of surplus ammunition has been delayed because of the presence of ‘unfavourable conditions’ for sales, such as:

- The lack of a comprehensive national ammunition and weapon inventory;
- The fact that most surplus ammunition is unserviceable, unsafe, or not marked, labelled, or classified according to international standards; and
- The lack of reputable end users willing to purchase such surplus ammunition.<sup>41</sup>

Problems of this kind would of course need to be resolved before BiH sells via export serviceable, but surplus, ammunition in conformity with its international commitments.

### Lesson 10. Serviceable but surplus ammunition can also be disposed of through international donations to demonstrate support for international partners

BiH authorities responded positively to requests to donate surplus ammunition to Iraqi security forces (see Table 4).<sup>42</sup> As mentioned above, the BiH president must approve the disposal of surplus through international donation after an assessment of political, strategic, and foreign policy considerations. MoD BiH and AFBiH representatives have raised two sets of concerns regarding such donations. The first is a concern over foregone profit. International stakeholders, however, have stressed that donations help to dispose of ammunition that, while still serviceable, needs to be used quickly.<sup>43</sup> Such ammunition is unlikely to meet the quality needs of commercial importers.

The second concern relates to the perceived risk of diversion of donated material.<sup>44</sup> This reflects recent media coverage of the possible diversion of BiH donations intended for Iraqi government forces to non-state armed groups in the Middle East and North Africa (Marzouk et al., 2016; Redžić, 2016). Yet diversion risks can be reduced via international cooperation and good practice (Parker, 2016). At the same time, such donations can allow BiH to contribute to efforts to strengthen international peace and security (BiH MoD, 2005, pp. 15–21).

**Table 4** Donations by the MoD BiH, 2015–16

	Recipient	Year	Export type (calibre)	Rounds	Tonnes
Ammunition	Iraq	2015	Infantry ammunition (7.62×52)	15,000,000	462.5
	Iraq	2015	Infantry ammunition (14.5 mm)	400,000	110
	Iraq	2016	Various artillery and infantry ammunition types	27,000	565

Source: BiH MoD (2017)

## Conclusion

This paper presents some of the key challenges faced by the BiH government and its international partners in addressing the safety and security risks posed by post-conflict ammunition surpluses in BiH. The paper began by outlining the negative impacts of the armed conflict on former Yugoslavia's well-developed ammunition management system. It then charted the difficulties of restoring an effective ammunition management system after hostilities cease but political tensions persist. Even with significant international assistance, it has taken time to design and implement a coordinated LCMA strategy that adequately addresses BiH's post-conflict ammunition management challenges.

This paper has introduced and applied the Small Arms Survey's LCMA model as a framework for analysing the emergence of an LCMA system in BiH between 2012 and 2016. In the process, it has only dealt with four of the five main components identified in the model—national ownership, planning, management, and disposal—because BiH has not yet made provisions for the procurement of ammunition, the other component. The priority for BiH to date has been to identify and dispose of excessive, unstable, and unsafe ammunition and to put in place the planning and management processes that will ensure the safety and security of the ammunition BiH needs to implement its national defence and security strategy.

The paper identifies ten key lessons learned from international efforts to support the development of an LCMA system in post-conflict BiH:

1. National ownership is fundamental for effective LCMA.
2. The coordinated, long-term commitment of international partners is essential for the establishment of LCMA in a post-conflict setting.
3. Implementing effective LCMA in a post-conflict setting requires early agreement on overall objectives, specific priorities, and resource requirements.
4. Sustainable LCMA requires robust organizational structures and appropriate personnel.
5. Successful LCMA rests on a comprehensive inventory of the ammunition stockpile.
6. Stockpile safety depends on an assessment of the condition of stored ammunition.
7. Adequate resources and capacities are needed for a safe and secure ammunition stockpile.
8. Effective and efficient surplus disposal requires adequate normative

and institutional frameworks, as well as the necessary political will.

9. Serviceable but surplus ammunition may be disposed of through export sales authorized in conformity with a country's international commitments.
10. Serviceable but surplus ammunition can also be disposed of through international donations to demonstrate support for international partners.

Some of these lessons may be relevant to international assistance efforts that support good ammunition management standards in other countries emerging from conflict, or to countries with limited resources and capacities. It will be difficult to replicate the high level of international attention and resources devoted to the establishment of an LCMA system in BiH. Nevertheless, this paper identifies certain principles and practices that could be applied to other post-conflict settings without the same investment of time and resources made in BiH.

A critical lesson of this study is the importance of building sustainable national capacity in post-conflict states willing to develop and implement an LCMA system. International donors will increase their chances of long-term success by ensuring, at an early stage, that the host government does not become dependent on external resources and expertise. It is, in other words, important to provide ammunition management training, equipment, infrastructure, and SOPs that are appropriate to local conditions and are also effective in reducing the risk of UEMS and diversion. With the right approach, the resolution of many of the ammunition management challenges seen in BiH will, in fact, be within the reach of other post-conflict states. ●

## List of abbreviations

<b>AFBiH</b>	Army of the Forces of Bosnia and Herzegovina (2006 to present)
<b>AMP</b>	Ammunition Master Plan
<b>ASS</b>	Ammunition storage sites
<b>ATO</b>	Ammunition technical officer
<b>ATT</b>	Arms Trade Treaty
<b>AWE</b>	Ammunition, weapons, and explosives
<b>BiH</b>	Bosnia and Herzegovina
<b>EU</b>	European Union
<b>EUFOR</b>	European Union Force
<b>EXPLODE</b>	UNDP Explosive Ordnance and Remnants of War Destruction Project
<b>EWG</b>	Expert working group
<b>FBiH</b>	Federation of Bosnia and Herzegovina
<b>IATG</b>	International ammunition technical guidelines
<b>IFOR</b>	NATO-led multinational Implementation Force

<b>LCM</b>	Life-cycle management
<b>LCMA</b>	Life-cycle management of ammunition
<b>LCMW</b>	Life-cycle management of weapons
<b>MoD</b>	Ministry of Defence
<b>MTT Project</b>	EUFOR 'Ammunition and Weapon Storage Site Management' Mobile Training Team
<b>OB/OD</b>	Open burning/open detonation
<b>OHR</b>	Office of the High Representative
<b>OSCE</b>	Organization for Security and Co-operation in Europe
<b>QPAK</b>	Quick propellant analysis kits
<b>RS</b>	Republika Srpska
<b>SAFE-UP</b>	OSCE Safety and Security Upgrade of Ammunition and Weapon Storage Sites in BiH
<b>SALW</b>	Small arms and light weapons
<b>SAWAD</b>	Senior adviser for weapons and ammunition disposal
<b>SECUP</b>	OSCE Security Upgrade of Ammunition and Weapon Storage Sites in BiH
<b>SEE</b>	South-east Europe
<b>SEESAC</b>	South Eastern and Eastern Europe Clearinghouse for the Control of SALW
<b>SFOR</b>	Stabilization Force
<b>SOP</b>	Standard operating procedure
<b>SRBiH</b>	Socialist Republic of Bosnia and Herzegovina
<b>SSR</b>	Security sector reform
<b>TND</b>	Total National Defence (Yugoslavia)
<b>TRADOC</b>	Training and doctrine command
<b>UEMS</b>	Unplanned Explosions at Munitions Sites
<b>UNDP</b>	United Nations Development Programme
<b>UNPROFOR</b>	United Nations Protection Force
<b>VF</b>	Vojska Federacije Bosne i Hercegovine (Army of the Federation of Bosnia and Herzegovina, 1992–2006)
<b>VRS</b>	Vojska Republike Srpske (Army of Republic of Srpska, 1992–2006)
<b>W/ASS</b>	Weapons and ammunition storage sites
<b>WMP</b>	Weapons Master Plan
<b>WSS</b>	Weapons storage sites
<b>YNA</b>	Yugoslav National Army

## Notes

- 1 For more information, see the Regional Approach to Stockpile Reduction (RASR) Initiative website: [www.rasrinitiative.org/resources-publications.php](http://www.rasrinitiative.org/resources-publications.php).
- 2 Author interview with a former Yugoslav-trained ATO currently working in the international non-profit sector, Sarajevo, 25 May 2016.
- 3 Author interview with an ammunition specialist currently working in the international non-profit sector, Sarajevo, 25 May 2016.
- 4 Email correspondence with a former Yugoslav-trained ATO currently working for the Slovenian MoD, 15 August 2016.
- 5 This resolution expanded the territorial coverage of the UN arms embargo on Yugoslavia imposed in September 1991. For more information on the arms embargo, see Cortright and Lopez, 2000.
- 6 Author interview with an AFBiH officer, Derventa, 1 February 2017.
- 7 Author interview with a senior military adviser to the commander of EUFOR, Sarajevo, 19 January 2016.

- 8 The OSCE was responsible for arms control and confidence building, including ammunition management. The Office of the High Representative for BiH was responsible for the 'civilian' components of the peace agreement.
- 9 SFOR established the Data Access and Retrieval for Entity Armed Forces programme (DARE) database to keep records of weapons held in WSS for use by SFOR and entity armed forces.
- 10 Author interview with former Yugoslav-trained ATO, Sarajevo, 25 May 2016.
- 11 Author interview with former Yugoslav-trained ATO, Sarajevo, 25 May 2016.
- 12 Assembly of the Western European Union, 2003. 'Developments in South-Eastern Europe', Report of the Assembly of the Western European Union, 49th Session, submitted by Mr Hancock, rapporteur, on behalf of the Political Committee, Document A/1820, 4 June 2003, p. 16.
- 13 Author interview with a senior military adviser to the commander of EUFOR, Sarajevo, 19 January 2016.
- 14 The EWG consists of EUFOR, NATO, the OSCE, and UNDP (EWG, 2010b, p. 3).
- 15 Author interview with high-ranking EUFOR officer working on arms control issues in BiH, Sarajevo, 10 October 2016.
- 16 The full official name of the Doboje Agreement is *Agreement on Final Disposal of all Rights and Obligations over Moveable Property that will Continue to Serve Defence Purposes* (2008).
- 17 Author interviews with various senior political representatives and high-ranking officers working in international organizations.
- 18 The procurement component of the Survey's LCMA framework is not addressed in this study since, according to the BiH government, there has been no procurement of ammunition during the period covered by this study. Author interview with a senior representative from the FBiH Military Industry Ministry, Sarajevo, 25 May 2016.
- 19 The official name of the Mobile Training Team is EUFOR ALTHEA 'Weapon and Ammunition Storage Site Management' MTT 2.1.6.1. It is composed of three troop-contributing nations: Switzerland (as the lead), Austria, and Sweden. For more information see: Carapic, Chaudhuri, and Gobinet, 2016, pp. 21, 27–37.
- 20 Author interview with senior representatives from the AFBiH 'Ammunition and Explosive Ordnance Storage Management Training Cell', Travnik, 11 October 2016.
- 21 Author interview with a senior political adviser to the Commander of EUFOR, Sarajevo, 25 May 2016.
- 22 Author interview with a senior political adviser to the commander of EUFOR, Sarajevo, 25 May 2016.
- 23 Author interview with a senior political adviser to the commander of EUFOR, Sarajevo, 25 May 2016.
- 24 Author interview with a senior political adviser to the commander of EUFOR, Sarajevo, 25 May 2016.
- 25 In February 2013, at a EUFOR workshop, an 'initial campaign plan' for addressing ten AWE challenges in BiH was presented to, and approved by, the international community. A key decision of the workshop was that the AWE Master Plan would initially focus on the ammunition stockpile, except for infrastructure upgrades at the two prospective WSS. Action on the weapon stockpile would be postponed to a later date. Author interview with senior military adviser to the commander of EUFOR, Sarajevo, 10 October 2016.
- 26 BiH signed the ATT on 25 September 2013 and deposited its instrument of ratification on 25 September 2014. It has been an ATT State Party since 24 December 2014.
- 27 The task force consisted of the 'best available' representatives from EUFOR, NATO Headquarters Sarajevo, and other partners (EUFOR, 2013, p. 2).
- 28 The convergence of the SALW Control Strategy and the priority areas of the AWE Master Plan stems from the involvement of both UNDP and the OSCE in the drafting of both documents. Author interview with senior military adviser to the commander of EUFOR, Sarajevo, 30 November 2016.
- 29 Author interview with senior political adviser to the commander of EUFOR, Sarajevo, 26 May 2016.
- 30 Author interview with senior political adviser to the commander of EUFOR, Sarajevo, 26 May 2016.
- 31 Author interview with high-ranking AFBiH representative, Sarajevo, 23 May 2016.
- 32 Author correspondence with AWE Task Force, AFBiH, Sarajevo, 4 April 2017.
- 33 Author interview with senior military adviser to the commander of EUFOR, Sarajevo, 19 January 2016.
- 34 Author interview with senior military adviser to the commander of EUFOR, Sarajevo, 10 October 2016.
- 35 The year 2010 is an outlier for ammunition disposal during the period 2009–14, because a large donation of surplus ammunition was made in this year from the MoD to the Ministry of Interior (BiH MoD, 2016).
- 36 Author interview with senior political adviser to the commander of EUFOR, Sarajevo, 26 May 2016.
- 37 Author interview with senior military adviser to the commander of EUFOR, Sarajevo, 10 October 2016.
- 38 Author interview with senior military adviser to the commander of EUFOR, Sarajevo, 10 October 2016.
- 39 Author interview with senior political adviser to the commander of EUFOR, Sarajevo, 26 May 2016.
- 40 Author interview with high-ranking AFBiH representative, Sarajevo, 19 November 2016.
- 41 Author interview with high-ranking EUFOR officer working on arms control issues in BiH, Sarajevo, 10 October 2016.
- 42 In 2013, the BiH MoD also donated 84 howitzers to the Afghan National Security Forces (BiH MoD, 2016).
- 43 Author interview with high-ranking EUFOR officer working on arms control issues in BiH, Sarajevo, 10 October 2016.
- 44 Author interview with senior BiH MoD representative, Sarajevo, 1 July 2015.
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