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Safer Stockpiles

Practitioners' Experiences with Physical
Security and Stockpile Management (PSSM)
Assistance Programmes

Edited by Benjamin King



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Small Arms Survey

Graduate Institute of International and Development Studies
47 Avenue Blanc, 1202 Geneva, Switzerland

Copy-edited by Alex Potter (fpcc@mtnloaded.co.za)

Proofread by Donald Strachan

Cartography by Jillian Luff, MAP*grafix*

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The objectives of the Small Arms Survey are: to be the principal source of public information on all aspects of small arms and armed violence; to serve as a resource centre for governments, policy-makers, researchers, and activists; to monitor national and international initiatives (governmental and non-governmental) on small arms; to support efforts to address the effects of small arms proliferation and misuse; and to act as a clearinghouse for the sharing of information and the dissemination of best practices. The Survey also sponsors field research and information-gathering efforts, especially in affected states and regions. The project has an international staff with expertise in security studies, political science, law, economics, development studies, sociology, and criminology, and collaborates with a network of researchers, partner institutions, non-governmental organizations, and governments in more than 50 countries.

Small Arms Survey

Graduate Institute of International and Development Studies

47 Avenue Blanc, 1202 Geneva, Switzerland

p +41 22 908 5777

f +41 22 732 2738

e sas@smallarmssurvey.org

w www.smallarmssurvey.org

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About the authors

F. David Diaz is a Foreign Affairs Officer in the Office of Weapons Removal and Abatement, Bureau of Political-Military Affairs, US Department of State. He coordinates programmes and develops policy to reduce the threat from the illicit proliferation of conventional weapons and munitions, with a focus on man-portable air defence systems and other small arms and light weapons. He has previously served at the Defense Threat Reduction Agency (DTRA) and in the Office of the Under-Secretary of Defense for Policy. He is a former US Marine Corps officer and holds an MA in International Relations from Boston University. The views expressed by Mr. Diaz are his own, and do not necessarily reflect those of the United States State Department.

Benjamin King is a consultant for the Small Arms Survey. His previous work with the Survey included serving as editor on the *Surveying Europe's Production and Procurement of Small Arms and Light Weapons Ammunition* working paper. He has extensive experience in programme management and research in Sudan, Uganda, and China. He holds a master's in International Policy from the Monterey Institute of International Studies.

Steve Priestley has been involved in mine action for over 20 years since the clearance of Kuwait following the first Gulf War, where he worked as a deminer. He was employed by the Mines Advisory Group (MAG) from 1995 as a Technical Advisor, then as a Senior Technical Advisor and Programme Manager in Angola, before spending two years working in MAG headquarters as Director of Operations. Part of his role from 2002 onwards involved supporting new programme start-ups and he was closely involved with establishing MAG small arms and light weapons projects in the Democratic Republic of the Congo, Burundi, and Rwanda. He was working as MAG's Director of Business Development when he wrote this report. He is presently working for G4S Ordnance Management in Afghanistan.

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—Benjamin King
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Abbreviations and acronyms

BwVC	Bundeswehr Verification Centre
CCTV	Closed circuit television
CMAC	Cambodian Mine Action Centre
DAC	Development Assistance Committee
DDR	Disarmament, demobilization, and reintegration
DoD	Department of Defense
DTRA	Defense Threat Reduction Agency
EU	European Union
EUR	Euro
GBP	British pound
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
MAG	Mines Advisory Group
MANPADS	Man-portable air defence system(s)
MFA	Ministry of Foreign Affairs
MoD	Ministry of Defence
MoU	Memorandum of understanding
NAMSA	NATO Maintenance and Supply Agency
NATO	North Atlantic Treaty Organization
NCB	National coordination body
NGO	Non-governmental organization
NOTAM	Notice to airmen
OBOD	Open burning open detonation
OSCE	Organization for Security and Co-operation in Europe
Programme of Action	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
QA	Quality assurance
RASR	Regional Approach to Stockpile Reduction in South-east Europe
RECSA	Regional Centre on Small Arms
SEESAC	South East and Eastern European Clearinghouse for the Control of Small Arms and Light Weapons
SSR	Security sector reform
UK	United Kingdom
UNDP	United Nations Development Programme
US	United States
USD	United States dollar
VAT	Value-added tax
WP	White phosphorus

Introduction

By Benjamin King

The goal of improving PSSM programmes

Maintaining defence and security sector weapons and munitions safely and securely is of vital importance, not only for a country's readiness to defend itself, but also for its internal safety and stability. Mismanaged or unstable stockpiles can potentially have serious consequences. Weapons and ammunition stolen from storage depots have fuelled crime, rebellions, and wars. Old or unstable munitions have spontaneously combusted, destroying entire stockpiles while inflicting casualties on civilians and non-civilians, and damaging nearby buildings and infrastructure. All state stockpiles are subject to these risks of theft and unexpected explosion. However, the risks are significantly reduced or mitigated when stockpiles are maintained effectively.

Proper maintenance requires investments in infrastructure and professional capacity in addition to sustained commitment from governments, which not all states can manage alone. In response to the gap between potential threats of unmanaged arsenals and state capacity, international assistance programmes are available. PSSM programmes are donor-assisted efforts to develop the capacity of a host nation to effectively protect and manage its arsenals throughout their life cycle. Activities may range from training security forces in accounting and munitions handling practices to enhancing theft prevention and deterrence measures and refurbishing or building new storage depots.

Despite the efforts and improvements that PSSM programmes have made in many states, their implementation has proven exceedingly challenging. A discussion with any PSSM practitioner—whether a donor representative, implementing partner, or contractor—will inevitably include expressions of frustration over the progress of a programme. The realities on the ground rarely allow for the rapid modernization of all the infrastructure and expertise necessary to make the system work, particularly in terms of the anticipated time frame and allocated resources.

This publication seeks to examine the challenges that commonly confront PSSM practitioners. The realities involved in transferring standards developed by modern militaries to countries using cold war or colonial-era infrastructure, or recently emerging from conflict, create real obstacles. Host countries typically are in transition phases involving major restructuring of their defence and security sectors, including the downsizing of forces or perhaps the incorporation of rebel groups. It is hoped that future programmes can benefit from the knowledge gained by practitioners' responses to the challenges that circumstances of this kind present. Yet host nations must have, and sustain, the will to implement improved practices.

What is PSSM?

Physical security and stockpile management activities are actions all militaries and security agencies take to secure and maintain their arsenals. While the quality of practices varies, at the core of each state's PSSM activities is a desire to ensure that weapons will be operational when needed and that only authorized personnel will have access to them.

Stockpiles have the unique characteristic of needing planning and protection against both external threats and internal mishaps (e.g. accidental explosions). The physical security of stockpiles aims to 'provide the capability to detect, access, communicate, delay and respond to an unauthorized attempt at entry' (US DoD, 1991, p. 13). Arsenals contain valuable materials. Procurement is a major expense, but so too is the storage of weapons stocks. Rigorous established standards outline the requirements in great detail, ranging from regulations for locks and the thickness and composition of doors to ID badges to restrict access, electronic security systems, and accounting procedures (e.g. OSCE, 2003, ch. 3). All of these requirements are designed to deter and prevent the theft or loss of the arms and ammunition stored at a particular site.

Stockpile management refers to the '[p]rocedures and activities regarding safe and secure accounting, storage, transportation, and handling of munitions' and weapons (Bevan and Wilkinson, 2008, p. xxx). It involves the procedures used to ensure that stored items are maintained and ready when needed. Management also includes taking steps to mitigate potential accidents. The activities are interdependent with those of physical security and require specialized sets of skills. Accounting procedures allow for lost items to be identified and the

extent of the degradation of the arsenal to be assessed. Storage requirements refer both to the level of security required for particular materials and to the proper environmental quality necessary to keep arsenals from deteriorating.

While it is not specifically included in the term PSSM, demilitarization is a vital part of all PSSM systems. Demilitarization is the 'complete range of processes that render weapons, ammunition, mines and explosives unfit for their originally intended purpose' (Bevan and Wilkinson, 2008, p. xxi). This process utilizes a range of techniques that are an essential part of a military's efforts to maintain properly functioning stockpiles and remove outdated or surplus items from depots. Although potentially expensive tasks are involved in this process, this expense is part of essential operating costs. In their simplest form, a state must maintain two capacities: 1) the ability to identify items that should be destroyed; and 2) the capacity to destroy these items safely. The removal of surplus and deteriorating weapons and munitions is necessary for the maintenance of a safe and reliable arsenal. In general, it is also one of the largest investments in both time and resources made by PSSM programmes (NAMSA, 2009, p. 10).

Assistance in PSSM systems is typically requested from countries in transition. States with massive stockpiles left over from the cold war require the largest programmes, as they are challenged by the sheer volume of the stockpiles that they have to deal with. Countries where a war has recently ended also often need assistance in comprehensively restructuring their security and defence systems. Other states have neglected their PSSM responsibilities over time. In some cases, weapons and ammunition purchases were not matched by a concomitant investment in maintenance. But the truth is that managing arsenals is an expensive undertaking. Infrastructure, equipment, energy, logistics, labour, and training all necessitate continuous and sustained funding. Unfortunately, many states do not consider these expenses when purchasing new weapons and ammunition.

Developed standards

The challenges facing PSSM programmes are not due to a lack of knowledge. Many governments and international organizations have developed thorough

and detailed instructions for dealing with all aspects of PSSM systems. Numerous best-practice guides provide a solid blueprint for developing a strong PSSM system in any country (see Table 0.1). They were developed by the coordinated efforts of dozens of experts from around the world. Best-practice guides provide the standards that PSSM systems should aim to achieve. The present publication is not designed to contradict these valuable guides in any way.

The present publication does not try to replicate these best-practice guides; rather, it aims to illustrate some of the practical challenges preventing PSSM practitioners from achieving international best-practice standards set by best-practice guides as they attempt to put the theory presented in these guides into practice. Programmes proved much more daunting than initially expected. Recipients and donors have entered into programmes unprepared for these challenges, which hinders their ability to achieve programme objectives from the start. Based on experience gained through previous PSSM programmes, therefore, the publication addresses the lessons practitioners have learned and

Table 0.1 **Best-practice guides**

Comprehensive international guidebooks

United Nations Coordinating Action on Small Arms (UNCASA), *International Small Arms Controls Standards* (ISACS), forthcoming

United Nations Office of Disarmament Affairs (UNODA), *International Ammunition Technical Guide* (IATG), forthcoming

South East and Eastern European Clearinghouse for the Control of Small Arms and Light Weapons (SEESAC), *Regional Micro-Disarmament Standards/Guidelines*, 2006

North Atlantic Treaty Organization (NATO), *Manual of Safety Principles for the Storage of Military Ammunition and Explosives* (AASTP-1), 2006

Organization for Security and Co-operation in Europe (OSCE), *Handbook of Best Practices on Conventional Ammunition*, 2003

- *Handbook of Best Practices on Small Arms and Light Weapons*, 2003
- *Best Practice Guide on the Destruction of Conventional Ammunition*, 2008

Examples of specialized guides

International Mine Action Standards (IMAS), *Mine Risk Education Best Practice Guides*, 2005

UN Economic Commission for Europe (UNECE), *UN Recommendations on the Transport of Dangerous Goods: Model Regulations*, 2001

North Atlantic Treaty Organization (NATO), *Minimum Standards of Proficiency for Trained Explosive Ordnance Disposal Personnel*, STANAG 2389, 2009

how, if they are properly prepared, some of the challenges can be avoided. Each of the following chapters was written by or in consultation with an expert practitioner.

Who are practitioners?

The term ‘practitioners’ refers to any of the technical experts involved in implementing or supporting PSSM assistance programmes. Usually from donor states, these personnel can include members of diplomatic agencies, experts from the military and security sectors, and programme managers.

Multilateral organizations often work as coordinating partners in PSSM programmes. The Forum for Security and Cooperation in the Organization for Security and Co-operation in Europe (OSCE), the South Eastern and Eastern Europe Clearinghouse for the Control of Small Arms and Light Weapons (SEESAC), the United Nations Development Programme (UNDP), and NATO’s Maintenance and Supply Agency (NAMSA) are among the primary coordinating bodies of PSSM programmes, yet several regional organizations also make significant contributions. As such, their role entails organizing PSSM programmes that can involve multiple donors and/or hosts. Each organization has in-house technical experts capable of leading such programmes.

The actual implementation of these programmes is often delegated to specialized contracting companies. These companies can be for-profit or non-profit entities from either the private or NGO sector. Many of the groups doing this kind of work originated from the demining campaign and their model of work reflects this background. Typically, operations involve small groups of international technical experts being deployed to the host nation to lead or train local staff. Building local capacity is therefore often a primary goal of each project they manage.

The knowledge presented in this publication is intended to assist the parties involved in bilateral and multilateral PSSM programmes and can be useful to donors, implementing bodies, and programme managers alike. Frequently encountered challenges are discussed and guidance on how to deal with them is provided. It is hoped that this publication will challenge programmes to properly assess the current state of affairs that a prospective PSSM programme

will have to deal with, discern the base needs of such a programme, and decide how can they be most effectively addressed. Some useful questions raised include:

- What realistic achievements can be expected from PSSM programmes?
- Are these programmes appropriate for the circumstances facing the host country?
- Are there more efficient ways to meet the programme goals?
- Even if the best standards were not met, did the programme still achieve the security or stockpile management goals?

The first chapter examines the process of planning a programme, focusing in particular on ways of avoiding common challenges. Chapter 2 discusses the implementation of PSSM programmes in least-developed nations, focusing on the challenges and limitations that practitioners sometimes face due to lack of resources. Finally, Chapter 3 provides a detailed case study of Germany's efforts to assist Cambodia with stockpile management and chronicles the complexity and details involved in the programmes that were undertaken.

PSSM programmes have made significant impacts on the storage and management of ordnance in many countries. However, improvements are needed in the design and implementation of such programmes. Multiple challenges consistently arise that stall programmes or prevent their objectives from being achieved. In general, recipient states need to be better aware of what their expected role in the programmes is and what conditions they should be prepared to allow for. Donors for their part need to acknowledge the high amount of uncertainty that accompanies the complex and sensitive nature of the programmes, and should anticipate inevitable setbacks. Despite the setbacks, delays, and problems that arise, programmes can and do achieve measurable results. If both recipients and donors are prepared for the obstacles, programme objectives will be accomplished with greater efficiency. 📌

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Chapter 1: Preparing PSSM Programmes: Avoiding the Inevitable Problems?

By Benjamin King and F. David Diaz

Introduction

Running PSSM programmes requires the proper management of a complex relationship between the host state (assisted state) and the donor and assisting entity. Establishing bilateral or multilateral programmes to improve a nation's security practices can be problematic, particularly when there is no long history of wide-ranging links between the donor and the assisted state. Understanding the challenges inherent in forming an effective partnership is essential to setting up a successful programme.

PSSM programmes require preparation, assessments of the current state of affairs, and thorough planning. This chapter explores the preparation and planning phases of PSSM programmes and highlights common challenges that arise along the way. Most of the issues raised refer to obstacles that significantly delay programmes or even prevent them from being implemented. Starting with the different ways of approaching PSSM programmes and moving to the assessments carried out before a programme is initiated and the programme planning process, the chapter provides recommendations for avoiding these setbacks.

The information found in this chapter was derived in part from interviews with many practitioners who have worked on PSSM programmes. While the chapter does not represent unanimous consensus, what follows does reflect many frequently recurring observations and practices. Published programme documents were also utilized when available.

Approaches to PSSM assistance programmes

PSSM assistance programmes can take a top-down or bottom-up approach. The first—and the focus of this chapter—is the more formal method, which

usually results from bilateral and multilateral agreements. Programmes of this kind are established through official or diplomatic channels and agreements are drawn up on a variety of topics related to military, security, and police cooperation and confidence building. The programmes are typically larger in scale, with goals that will be achieved over a period of years. They also tend to be more strategic, designed to address larger security concerns such as national defence reform or regional instability. Such programmes require significant attention and support from senior leaders, since they are designed to create conditions for long-term, structural improvements to a nation's security forces.

The second method is a more organic approach. Bottom-up programmes are initiated at lower or more localized levels of decision making, such as police chiefs and storage facility managers. These programmes often build on relationships and trust gained through previous collaborative efforts. As one project progresses, the team implementing it tends to be given greater access to storage or other facilities and is thus positioned to identify new areas of concern. The development of a strong rapport between local security officials and members of the team implementing a programme can result in information and problems being more freely revealed. Cooperation in programmes of this type is often greater, as they are based on relationships that have already been established. One should note that many programmes using a bottom-up approach owe their existence to the in-country experience gained during previous top-down, negotiated programmes.

Both methods have their advantages and disadvantages. Top-down programmes can be more holistic in their design and therefore better coordinated (see the section entitled 'Planning the project'). It has also been argued that this approach can create a greater sense of accountability if senior officials are involved in their planning and implementation. Bottom-up programmes, however, avoid the massive bureaucracy that results from too many stakeholders and formal, high-level (e.g. government-to-government) arrangements. Programmes may also function more efficiently if good relations between members of the implementing team and host country officials have already been established.

Unless otherwise stated, this chapter discusses the issues involved in a top-down, strategic approach. Chapter 2, in turn, takes a more thorough look at the bottom-up approach.

Initiating programmes: requests from a host government

Through PSSM programmes, a host government seeks assistance to manage sensitive materials that are important to its national security. Programmes of this kind are initiated by senior officials in the ministry of defence (MoD), the ministry of the interior, other law enforcement authorities, or the ministry of foreign affairs (MFA), who usually start by contacting the embassy of the nation that they intend to ask for assistance. In some cases, lower-level officials might initiate such contacts, but expensive, multi-year programmes typically require senior officials to take key decisions at some point (Karp, 2010, p. 2).

Several national governments, NATO, UNDP, and the OSCE all require an official request from a nation needing assistance as a necessary first step before they become involved. This request acts as the initial documentation formalizing the complex diplomatic relationship between the host and assistor. Given the nature and sensitivity of these kinds of programmes, this relationship will need official documentation throughout the programme's cycle. Donors too can make the initial offer of assistance based on their concerns, but still need an official request from the host nation. This request is seen as the formal confirmation of a host nation's desire for assistance. It is a statement by the host nation that its current PSSM practices need improvement to avoid potential dangers both internally and internationally.

Requests for assistance of this kind provide the donor—or donors—with an initial understanding of the specific goals that need to be achieved and the concerns that need to be addressed. The OSCE, for example, requests information about the type and quantities of weapons and ammunition involved, the condition of these items, and what the requesting state wishes to have done to them (OSCE, 2003b, Annex 1). The request for assistance can serve as an invitation to allow into the country an expert assessment team from the country providing the assistance to evaluate the conditions in the host country and determine the needs and priorities of a possible programme.

Donors initially attempt to understand the reason why the country in question has asked for assistance. Most often, countries seek assistance because they acknowledge a need for it, are unable to fulfil the requirements of a multi-

national agreement that they have signed, or are responding to a disaster. The latter is obviously the worst kind of reason, as damage has already been inflicted. However, governments responding to a disaster are more likely to be willing to make changes to their PSSM system, because the need to do so is painfully evident. The political consequences of accidental depot explosions or violence linked to state weapons getting into the wrong hands can threaten the stability of a government and/or its officials (Hala, 2008). Senior-level officials who understand the value of a properly run PSSM system can be a major factor in a programme's success (Ashkenazi, 2010, p. 152). Alternatively, a lack of senior-level support can stop progress completely. The degree to which the host government exercises the will to act is one of the key factors in determining the ultimate success of the assistance programme.

Formalizing cooperation agreements can take time. Donor states might require between three and six months to assign the necessary funding to a programme, while multinational organizations require even longer. Responses to a crisis or disaster can be exceptions to these lengthy processes: emergency funds can be made quickly available under certain circumstances. The typical process of providing assistance, however, requires considerable time to allow the establishment of working and legal relationships.

These relationships are important. Communication is a vital part of all international assistance programmes, especially PSSM programmes, which deal with military and security issues. Modernizing a country's military and security infrastructure and protocols involves numerous branches and levels of both the military and the broader government. Maintaining dialogue among stakeholders becomes a vital coordination task, as communication breakdowns are one of the most common sources of problems and delays for PSSM programmes. Effectively functioning points of contact in key positions in the various stakeholder organizations can make or break a programme, as they can facilitate the kind of communication that is necessary to overcome the inevitable problems that will arise. And the drafting of formal agreements is an important part of communication too, as these documents formalize the goals of the programme and create a sense of accountability.

Determining needs: the assessment process

PSSM standards provide points of reference when determining a state's needs. The OSCE's (2003a) *Handbook of Best Practices on Small Arms and Light Weapons* includes chapters on weapons marking and record keeping (ch. II), stockpile management and security (ch. III), indicators of surplus (ch. VI), and weapons destruction (ch. VII). NATO and SEESAC have similar guidebooks. And currently under production by the UN Coordinating Action on Small Arms are the International Small Arms Control Standards. These standards contain technical and policy advice for both policy makers and practitioners (UNCASA, forthcoming, p. iii). Eventually there will be standards that cover legislative and regulatory issues (Series 2), the design and management of small arms programmes (Series 4), and operational support (Series 5) (UNCASA, forthcoming, p. 5). Donors have expert teams skilled at conducting thorough assessments that evaluate how far a state's PSSM practice meets these standards.

Despite these guides, it is important to recognize that widely different perceptions of the conditions prevailing in a host country can exist, which can lead to difficulties when the programme is being designed. One country's understanding of what the term 'surplus' means can also greatly differ from another's. Similarly, one nation might perceive a liability where another might see an asset. The way in which these elements are perceived can therefore significantly affect the partners' positions. Also, expectations on the extent of a donor's investment in a PSSM system (e.g. funding and resources) can vary greatly between donor and host (see Chapter 2). Different notions of confidentiality or openness—e.g. regarding data on current and planned weapons and ammunition holdings or expected changes in defence planning—can come to the surface. Agreeing on these areas can be a difficult process that can greatly affect the outcome of a PSSM programme.

Overview of the assessment process

Whether conducted by foreign or domestic expert teams, assessments evaluate the host nation's stockpile management systems, stockpile stability, storage conditions and security, and transportation and demilitarization practices and capabilities (SEESAC, 2007, pp. 2–7). Ideally, these evaluations are very thor-

ough and are conducted in cooperation with the potential donor. This is an important step for donors, as it allows them to assess the level of the current practice in the entire PSSM system. Given the interdependence of the various parts of an effective stockpile management system (discussed later, in the section entitled 'Holistic approach'), it is important that all aspects of the PSSM system are covered in the assessment. As host nations generally lack the capacity to manage their stockpiles at an ideal level, many require the knowledge of expert personnel from the assisting or donor country. The knowledge of a variety of systems possessed by the members of the assessment team will be an important advantage, as they will be aware of the full range of possible problems that the programme might encounter and the possible solutions to these problems.

While assessments may identify practices and conditions requiring improvement, the assessment team will also note those parts of the system that are functioning properly. Their observations will therefore take into account areas where the current state may not be ideal, but is still functional, e.g. an old storage unit effectively preventing the leakage or theft of weapons. A functioning unit or facility will require fewer resources, allowing areas of most urgent need to be the initial focus of attention. The building of trust between the donor and the host is one of the primary means of encouraging cooperation, and this process will start with the initial assessment.

As the first operative action of the PSSM assistance programmes, the assessment also presents the first test of how well the communication system is working. Discussions involving the deployment of the assessment teams need to go deeper than just the diplomatic level. Military officials at the joint staff armaments division level, for instance, should already be involved. Practitioners also noted the need to ensure that depot commanders are properly informed about and ready for the team's arrival. One practitioner's experience illustrated the importance of this type of communication. The assessment team flew into the capital of the host country for a scheduled visit to a depot the following day. Upon arrival, however, the team learned that the military had no prior notification of its visit. The host MFA had not coordinated the trip with the host MoD, which in turn had not authorized visits to any military sites. Complicating matters still further, state regulations forbade foreign military officials from entering storage depots. Obtaining permission for the team to access the site

therefore became a complicated task that required the negotiation of an agreement that these regulations would not apply to the team members. The team waited in a hotel for three days before deciding to leave the country. Not only was the time of the assessment team wasted, but the stalled negotiations delayed the provision of urgently needed assistance to the host country for several years.

Obtaining access to stockpiles

Without a doubt, gaining access to stockpiles is the most consistent problem that the practitioners interviewed had to face. Governments are usually reluctant to allow foreign entities even to see stockpiles, let alone play an active role in how they are managed. In some cases, forbidding foreign groups from entering a depot is even formalized under law. Both developed and developing nations prevent the disclosure of information about stockpiles and their security systems. The materials held are seen as strategic state assets and protecting them is a matter of national security. PSSM programmes are expensive and the systems are complex. However, donors, as with other aid programmes, want to know that their donations will address a genuine need. Without access to facilities to verify the need—and, once the programme gets under way, the improvements that are being funded—donors may be reluctant to provide support. The issue of access to storage sites is responsible for numerous delays in programmes and can even prevent some from starting.

Donors are reluctant to fund programmes if they cannot independently verify the condition of the host country's stockpiles. For them, assessments not only indicate the kind and level of support that is needed, but, equally importantly, provide the benchmark against which later progress can be evaluated. Finding a balance between the host country's desire to protect its stockpiles and the donor's need to assess their condition becomes the first obstacle to overcome. The OSCE, for instance, usually agrees on what data is to be provided and how access to stockpiles is to be managed by drawing up a 'programme of the visit' that the host country has to agree to. Memorandums of understanding (MoUs) that define exactly how the project will be implemented are developed after an assessment.¹

PSSM practitioners require access to stockpiles in each programme phase, from assessments through programme development, implementation, and

post-programme evaluations. Different tasks require different levels of access. Assessments are probably the most intrusive phase of the programme, as they might involve testing the condition of facilities and stockpiles, whereas the implementation phase could simply involve verifying work completed outside of depots. The programme's goals also dictate the activities that require foreign implementers to be given access to storage facilities. Programmes involving massive overhauls of current stockpiles and management practices require much more elaborate assessments and involvement. Some cases require a less invasive approach from assistors. Another option is to use contractors from the host country to deal with smaller, more specific, or technical aspects of the programme. When a storage facility is being upgraded, for instance, local contractors can deal with any construction that is needed, while a foreign group might come in only to set up the security alarm system.

Often, refusals to allow access at depots are the result of a lack of proper communication between the various levels and departments of government involved. Agreements made at higher levels may not reach depots. In other cases, military commanders may be willing to allow access to depots in exchange for PSSM support even though diplomats fail to agree. Thorough documentation of a group's right to enter particular facilities must be provided and all those who need to know about this at all levels must be notified. Differences between negotiated political agreements and the actual extent of permission granted to implement the agreement at storage facilities can cause numerous delays and frustrations. Agreements must therefore provide specific detailed information that lays out: 1) who is allowed to visit sites; 2) which sites they can visit; 3) what specific tasks they will perform (such as counting weapons, assessing storage conditions, etc.); and 4) when these tasks will occur. Agreements cannot stop at just the diplomatic level. Military, security, police, and other related decision makers may need to play a prominent role in the negotiations if they are responsible for ensuring that the agreements are put into practice.

Some practitioners in the past have had to make the most of restricted access. Following a 2008 ammunition depot explosion in Kagan, Uzbekistan, the Uzbek MoD sent a formal request for US assistance requesting the training of soldiers in unexploded ordnance disposal. Within four weeks of the explosion, a team from the US Department of Defense (DoD) was in Uzbekistan to perform the

assessment. The team was given a short seven-day period to conduct the training and was not allowed access to the military depot in Kagan. Given the limited time available, the DoD team decided not to waste time by negotiating at higher levels. Instead, team members held training just outside the depot. Ordnance dispersed in the surrounding area by the unintended explosion (kick outs) was used for 'live' training (Voegel, 2009). This compromise effectively saved the programme from severe delays while still providing the training that had been requested. However, it increased the danger to the trainers and trainees, as the munitions were in a much less predictable state. The final results were also not as good as they could have been, as the team was not able to assess the stocks remaining in the depot.

Photography

The visual verification that photographs provide is a valuable tool for donors and assistors, yet taking them can cause problems. Photographs provide visual evidence of the kind of challenges that the PSSM programme will address, which allows adequate resources to be allocated and the right technical solutions to be found. One practitioner also described photos as one of the most effective means of 'greasing' (i.e. getting hold of) the necessary financial support, because donors can actually see what the problems are. Before-and-after photos also allow the progress and final results of the programme to be assessed. For multi-year programmes, the ability to illustrate the improvements that have been made in a particular year helps to secure funding for subsequent years.

Similar to their concerns over access, host states are usually reluctant to allow or tend to restrict the taking of photographs. This is sometimes due to the fear that the photographs will be used to gather intelligence about the country's defence capabilities. In other cases, a site commander may not want visual evidence of the faulty practices occurring within his facilities, for which he is ultimately responsible, to be made public.

Underlying these concerns is the notion of trust. A host country's willingness to allow photographs to be taken is treated as a sign of the level of cooperation a programme will receive from the host country. Donors have delayed or denied funding because they were not able to document the work they were preparing or funding. In some cases where permission to take photos was denied,

donors provided less funding, and more resources were focused on countries where trust was established, as programmes there had greater chances of success.

In most cases, the parties eventually solve their debate between state secrecy and the utility of photographic documentation. Agreements are reached that permit assessment teams to photograph specific facilities and stockpiles. This arrangement is sometimes made informally between practitioner and depot commander by the practitioner simply asking, 'Can I take a picture of this?' and the commander agreeing. Or it is made more formally earlier with the understanding that a member of the host country's MoD must first approve the pictures before they leave the country.

Physical security, condition of stockpiles, and safety/security procedures

The level of physical security and the safety of storage facilities depend on the external and internal steps taken to prevent theft or explosions and to reduce the likelihood of such events occurring and their impact should they occur. The quality and conditions of both the storage facilities and stored materials must be determined. A weapons storage facility is examined for its security measures (such as fences, gates, locks, alarms, lighting, etc.), safety considerations (signage postings, fire-fighting equipment, engineering specifications for building blast mitigation, safe distances, etc.), and environment (humidity levels, air flow, cleanliness, etc.) (AASTP, 2006, s. 2, ch. 3). Equally important, particularly for munitions, is knowledge of the conditions and stability of the stocks stored, as they are important aspects of stockpile security. Vital to all of this are the procedures and practices in place to manage the system and ensure that the other aspects function properly and coherently.

Management is a key component of PSSM systems and is something that assessment teams need to observe. In order to implement national policy at multiple local sites, a functioning management hierarchy needs to be in place and working properly at every level. National policy and commitments need to be applied at each depot. This hierarchy requires a chain of command and the establishment of standard operating procedures as a means of control (OSCE, 2003a, ch. III, p. 7). This organizational system helps create consistency and proper standards throughout the entire PSSM system.

One of the key areas where expert assistance is most needed is during the assessment of stockpile conditions. Internal environmental conditions should be assessed, as they can affect the stored explosive ordnance. Assessing the condition of stocks requires both the physical inspection and the chemical analysis of stocks by experts (Bevan, 2008, p. 51). This goes beyond merely relying on the expiry date as an indicator of the condition of the stock, as shelf life is only one indicator of possibly defective ammunition. Host states should therefore not rely solely on shelf life as a way of measuring stockpile safety (Wilkinson, 2008, p. 62). Propellants and energetic materials in particular must be tested for safety and stability. The skills, knowledge, and technology needed for chemical testing are not quickly acquired by or readily available in all states. States that produce their own ammunition usually have the required knowledge and technology needed to carry out these tests. Even then, they might not have the skills to test some sophisticated munitions, which would require specialized expertise, especially in cases where munitions have been in the stockpile longer than the personnel responsible for managing them—it is not uncommon for practitioners to come across ammunition left over from World War II (Griffiths and Karp, 2010, p. 212).

Risk and threat assessments

Risk and threat assessments build the knowledge necessary for properly planning a programme. Analyses are made by calculating the range of risks and threats; the probability of their occurrence; and their potential impact on the items stored, the storage facilities, the hired personnel, and the property, populations, and environment that would be affected. This information enables practitioners to make informed decisions about how best to implement the programme. The identification of imminent threats helps to determine the needs and priorities of the programme; these needs and priorities are most apparent after an accidental explosion. The dangers that could possibly result directly from the activities of the PSSM programme must also be assessed before planning starts, as this analysis could greatly alter the activities that are planned.

Not only immediate issues should be considered, however, but also possible future events. Factors such as security analysis, defence planning, and socio-economic development all have an impact on physical security and stockpile

needs.² An assessment therefore must look further than merely the current state of affairs. Security threats change, as do defence needs (see Chapter 2). Therefore, long-term analysis needs to take into account factors such as expected changes in the size of the host country's armed forces, changes to defence budgets, or increasing or easing tension with neighbouring countries. Socio-economic development too can greatly affect the challenges facing PSSM systems and must therefore be considered in the assessment. Over a five-to-ten-year period, a country can change substantially. Urbanization and city expansion can result in people living very close to storage facilities near cities, making these facilities a potential danger to life and property. Facilities at prime locations can be forced to relocate as development expands into the area or increases the value of the land on which they are built. These are important variables to examine, and failure to compensate for them can be detrimental to the programme's long-term success and utility.

Assessing stockpiles and surplus

Stockpiles are generally categorized as: 1) operational; 2) war reserve; 3) training; 4) experimental (in producing nation); 5) production; and 6) surplus, awaiting destruction (SEESAC, 2006a, p. 2). Other categorizations exist: several countries from the former Soviet Union, for instance, use a classification system based on operability, where weapons are divided into the categories of new, slightly used, in need of repair, in need of large repair/overhaul, and inoperable/to be removed from arsenal.³ Despite these differences, each method defines categories of weapons/ammunition ranging from those with strategic purposes to those destined for removal from the stockpile. However, categorizing items is often a contentious issue in many PSSM programmes. No international instrument formally defines how items should be categorized. Instead, this is determined by each state in its own way: according to the OSCE, 'it is for each state to assess its own security situation in accordance with its legitimate security needs and to decide on the size and structure of military and security forces in order to achieve its constitutional tasks' (OSCE, 2003a, ch. VI, p. 2). Equipping these forces follows the same line of thought. States decide on what equipment their forces need by evaluating geo-political threats, internal stability, national security, international commitments, and the size of their armed

forces (Zalkalns, 2002, p. 50). The OSCE defines equipment that is needed as a country's defence stock. Surplus is therefore all items that exceed the government's defined defence stock, plus unstable munitions (Griffith, 2010, p. 182). Each grouping will require specific management and storage arrangements.

This categorization is important for determining the course of action needed to deal with the various items. For some countries, however, the first step in allocating weapons to categories begins with acquiring accurate information about the weapons and ammunition they possess. In addition to poor accounting practices, the strategy of 'popular defence' further reduces a government's knowledge of its stockpiles. This strategy, used by many states, resulted in small caches of small arms and light weapons and ammunition being stored in rural areas to supply local defence units (Ashkenazi, 2010, p. 142). Over time, the central authorities often not only lost track of what these weapons caches contained, but also of the caches themselves.

The surpluses that those providing assistance frequently encounter are mainly the result of changes in a state's conflict status or the downsizing of personnel requirements as part of larger defence and security reforms. By far the largest surplus stockpiles are found in ex-Soviet satellite states. The end of the cold war, the dramatic decrease in the size of these countries' standing armies, and attempts to modernize their defence forces as part of their bids for EU or NATO membership created the huge armaments surpluses in such countries. By categorizing items as surplus, the state acknowledges that ordnance no longer has defence or security value; it therefore takes steps to remove the items from its arsenal.

Asset vs liability/sell vs destroy

Surplus stockpiles can be sold, donated, destroyed, used increasingly for training (in the case of ammunition), or dumped at sea (SEESAC, 2006a, p. 6). With the exception of dumping at sea—which is strongly discouraged due to environmental concerns—all these are internationally considered acceptable practices. Multinational frameworks, however, have consistently stated a preference for destruction. The UN's Programme of Action to Prevent, Combat and Eradicate the Illicit Trade in Small Arms and Light Weapons in All Its Aspects (Programme of Action) encourages states to provide assistance in the destruction or other

responsible disposal of surplus stocks (UN, 2001, part III, para. 14). The OSCE states that 'any small arms identified as surplus to a national requirement should, by preference, be destroyed' (OSCE, 2000, s. IV(C), paras. 1–2). What a government does with its surplus stockpiles is largely dictated by how it categorizes this surplus. Surpluses can be categorized in two main ways, depending on whether governments view them as assets or liabilities. Governments that view any weapons and ammunition as assets recognize the costs involved in their procurement and their value, even if unused, for ensuring the state's security. As a result, these states often feel that they should be compensated for any weapons and ammunition that they decide to dispose of. Therefore, keeping or selling the surplus becomes the most logical solution, and many governments find it difficult to destroy surplus stocks.

While there is certain logic to perceiving surplus stocks as assets, modern militaries generally view them as a liability. Direct costs and inherent risks are associated with retaining surpluses. These factors motivate states to get rid of any surpluses as soon as they are identified. The costs of retaining surplus weapons and ammunition are significant. OSCE best practice states that surpluses should be stored separately from other stocks (OSCE, 2003a, ch. VI, p. 3), which means that states will have to pay for electricity, maintenance, and additional salaries for depot guards for these separate storage units for an indefinite period (Faltas, 2010, p. 91). Indirect costs also arise in the form of reduced space to store needed stocks in depots. This makes retaining surplus stocks counterproductive to many PSSM programme goals, particularly for countries trying to drastically reduce the number of their depots, such as Bosnia and Herzegovina's attempts to reduce this number from 54 to seven (SEESAC, 2006b, p. 29). Risks are also associated with retaining surplus stocks, as time increases the possibility of both accidental explosions and diversion (theft). These threats can have both financial and political consequences for the responsible entities. This encourages states to get rid of surplus weapons and ammunition by whatever means necessary.

The marketability of surplus stocks is one of the major problems linked with the decision to sell. Generally, legitimate state actors are not very interested in acquiring aged stocks. Many modern militaries will not purchase old equipment, particularly those with aging explosive and propellant components.

The one exception is cases where the items are needed for immediate use, such as in active conflicts. Therefore, while the transfer of surplus can be perfectly transparent, it is possible that a greater percentage of surplus sales end up in the black or grey markets because of this limited customer base. This low demand also results in severely delayed transfers. Some surplus has remained on sale for indefinite periods while demilitarization efforts are put on hold. As a form of compromise between the donor's desire to see the items removed quickly, hosts are often given a period of grace to test the stock's marketability to see if there is a potential buyer (Griffiths, 2010, p. 188). In Albania, an agreement was reached that gave the country a set period to explore the possibility of selling surplus items. If no buyer were found during that time, then the items were to be destroyed.⁴

Assessing destruction capabilities and logistics

Countries with large stockpiles of a variety of weapons and ammunition types will require a wide range of destruction methods. Ammunition and explosives in particular create many challenges for safe and efficient disposal, as the variety of calibres and explosive materials cannot safely and effectively be rendered safe through one set practice. Open burning open detonation (OBOD) and industrial demilitarization are the two primary methods of disabling weapons and ammunition or explosives (see the section entitled 'Getting rid of excess: demilitarization options', below). Most modern PSSM systems use both in parallel, as the many different types of arms and ammunition and the huge variations in their condition require both methods to be used (NAMSA, 2009, p. 6). Political consequences and environmental concerns often prevent the simplest method of dumping in the ocean being used, particularly for many donor-sponsored programmes.

Assessing current demilitarization capabilities requires deciding which previous practices can be used and identifying the various similarly tooled industries currently operating in the host country, as well as industries that can be retooled for demilitarization tasks. Locations for using destruction equipment and setting up blast sites will be examined for their suitability, while the logistical support and infrastructure currently available are also evaluated. In general,

demilitarization OBOD locations should be at a safe distance from, yet relatively close to, depots to reduce security and safety risks and limit the cost and dangers of transporting the weapons and ammunition to the OBOD sites.

Acquiring and putting in place the logistics required to destroy stockpiles often cause multiple delays and disruptions to the programme. The problems that arise are difficult to predict, particularly when a team is working in an unfamiliar environment. Some of these problems are often outside the control or scope of the programme, so it is important to be flexible when designing it. Road conditions are a particular concern, as transporting explosive materials on crowded or poorly maintained roads adds to the dangers. How roads are affected by bad weather is another concern, as in some areas roads become impassable for large trucks during certain seasons, which will delay the programme. Wind, overcast skies, extreme heat, and grass fires can also affect OBOD sites (AASTP, 2006, p. ii.7.21). These issues are country-specific challenges, which people who are unfamiliar with the context find difficult to identify. They are important factors, however, because avoiding potential delays or setbacks can greatly increase the efficiency of the programme.

Some logistical problems can be overcome by using the host country's pre-existing industries as contracted partners to carry out parts of programmes. Firstly, certain industries may already possess skilled or semi-skilled labourers and possibly machines such as kilns or metal cutters that can be used to destroy certain stockpile items. Using existing infrastructure and skills can reduce the number of logistical challenges by eliminating the need to import machinery or run extensive training courses. Retooling of industry is another option. States with weapons- or ammunition-manufacturing capabilities are particularly capable of assisting with demilitarization by altering their production lines. The added benefit from supporting local industry should not be underestimated either. These investments into programme needs also act as development funds. This can help gain the local community's support for the programme, as opposed to contracting outside labourers.

It should be noted that it is not possible to use local industry in every country. Some states lack the industrial production capacity, which may first have to be developed. In other cases, conflicts of interest could arise when working with local industry. Often the state owns the weapons- and ammunition-manufacturing

industry or military officials have direct links with it. Both situations increase the potential for corruption. Projects can slow down significantly if the people responsible for clearing depots of surplus also receive financial benefits if donor support continues for longer than planned. Practitioners frequently mentioned being confronted with requests for bribes and demands for exorbitant fees. Background checks and limiting the use of subcontractors are two ways of preventing these complications from occurring.⁵

Planning the project

Determining how to meet the needs efficiently

Quickly bringing a nation with a history of substandard PSSM practices up to a level equivalent to OSCE best practices and NATO standards is not a realistic goal. Infrastructure and institutional knowledge need to be developed, which takes time, as well as more resources than might be available. Given the inevitable time and funding limitations, plans need to reflect steps that efficiently fulfil the needs of the country that is being assisted. The core needs of securing arms against diversion or safely storing ammunition against accidental explosions lie at the heart of PSSM programmes. The various best-practices handbooks set standards capable of achieving these needs. However, smart, efficient, and less complex solutions also exist and can satisfy the immediate safety and security needs of the assisted country.

Practitioners recommended that planning should incorporate holistic, phased, practical, and coordinated approaches with clear-cut funding arrangements throughout the programme.

Holistic approach: looking at the overall health of the PSSM system

PSSM systems are made up of an interrelated series of activities undertaken by states in order to ensure that their weapons are secured, maintained, and accounted for responsibly. All the parts of a properly functioning system work in cohesion so that each part supports all the others. Shortfalls in one area of a system can theoretically pose a threat to the overall stability of the system. For example, police firearms locked away safely but without accounting records

are not properly managed, just as aging munitions guarded to the highest standards but stored in humid environments may not be safe.

A holistic approach to PSSM programmes therefore aims to establish systems made up of a variety of interrelated activities that function coherently. Stockpiles are secure and accurately accounted for, staff are trained and well managed, and surpluses are removed. In such a system, weakness in one area threatens the overall efficiency of the system. Therefore, the most efficient programmes build up the various parts of the system simultaneously. From this, it follows that achieving best-practice standards in one area of PSSM while neglecting others does not result in a properly functioning system. A programme consistently making smaller adjustments while gradually improving all parts of the system might in the end provide a stronger overall system. In this context, it is important to identify the parts of the system that already work properly, so as not to waste time and money ‘fixing’ something that isn’t broken.

Holistic PSSM programmes require significantly more cooperation, planning, and—potentially—funding. Yet they are more likely to succeed in reforming a nation’s management of its defence materials. Experienced practitioners have found low-cost ways of making significant improvements to each aspect of the project (see Table 1.1). These no-/low-cost actions allow more gains to be made early on in a programme that will improve the weakest parts of a PSSM system. Conditions obviously vary according to the situation in each country needing assistance. However, taking a holistic approach when designing a programme will encourage planners to come up with low-cost ideas during the planning stages.

Phased planning

Large multi-year PSSM programmes normally run in phases, usually in one-year intervals, based on the availability of donor funds. Operating in phases allows both parties to set goals for the allotted time period. Evaluations occur at the end of each phase, providing the opportunity to assess the previous work, make recommendations or changes as needed, or allow each party to decide whether it is worthwhile continuing with the programme. If donors do not see genuine efforts being made by host countries or if hosts find donors unreliable in their commitments, then programmes end early.

In general, PSSM programmes schedule activities each year according to their potential risk. Risk assessments gauge the probability of a threat occurring and its potential severity based on current conditions, the variables impacting that risk, and possible factors that might change these variables (DDESB, 2009, p. 18). The results allow the assessment team to give immediate priority to the areas of greatest concern, such as severely degraded or damaged explosive materials, or poorly secured, highly sensitive weapons such as those weapons found in UN Category 1—MANPADS (man-portable air-defence systems) and ready-to-fire missiles. The planning process should take the most urgent needs and basic project goals into account and draw up a plan based on the resources that are available. The less urgent programme goals will be addressed in parallel and later phases, depending on the availability of resources.

A hierarchy of projects based on the urgency of their need does not imply that non-urgent areas need not be improved. As previously mentioned, a proper PSSM system requires that many areas work together in order to be effective. However, PSSM programmes are often quite large, so having realistic expectations during the planning stage makes it more likely that the programme will succeed. A logical, intelligently sequenced plan is the best method for making the entire system work properly, piece by piece.

The various phases can be divided into short-, medium-, and long-term plans.

Short-term plans: practical, manageable tasks that the host country can accomplish on its own or with little assistance

Short-term projects are the more easily accomplished tasks that require little or no assistance. They are the ‘low-hanging fruit’ of proper PSSM practices yet, dollar for dollar, their results are among the most efficient at improving conditions. Many tasks demand little more than labour and leadership to get the job moving. Paid soldiers generally provide much of the labour. As for leadership, simple guidance or suggestions can initiate the action.

No- or low-cost tasks are often the first and most appropriate steps to address the most obvious mishandling of stockpiles. Cutting grass and removing trees from around storage depots, for example, remove the risk posed by forest fires. Basic sorting and accounting of weapons often require merely organizing the

Table 1.1 **Examples of phased programming**

Examples	Storage	Demilitarization	Security
Low costs/ short term			
1	Enforce compatibility requirements in munitions storage areas	Carry out open burning of excess weapons	Restrict access to all facilities
2	Evaluate and enforce explosive safety quantity distance between storage locations	Identify and segregate excess and damaged weapons and munitions	Train local guard force regarding security requirements and responsibilities
3	Systematize regular magazine clean-up, landscaping, and vermin control procedures	Destroy individual 'vital' excess weapons components to render overall system useless	Develop and post standard operating procedures
Medium costs/ medium term			
1	Install gun racks	Purchase firearms-cutting equipment	Install intrusion detection equipment at critical storage facilities
2	Install lightning protection systems	Carry out open burning of excess or damaged propellant and small arms (20 mm and less)	Augment guard force with dogs
3	Install fire-fighting equipment (fire extinguishers, shovels, etc.) at each storage site	Carry out open detonation of explosive ammunition	Install perimeter and interior fences at critical facilities
High costs/ long term			
1	Move storage facilities away from populated areas	Obtain modern transportation equipment to support demilitarization and storage operations	Install internal and perimeter lighting at all facilities (might require generators to be installed or power lines to be run)

2	Formally train and equip personnel regarding explosive ordnance disposal and ordnance handling skills to meet international standards	Establish industrial demilitarization plants	Install intrusion detection equipment at all facilities
3	Construct armouries and magazines/ bunkers that meet international best-practice guidelines	Develop chemical testing facilities to monitor munitions stability and performance	Install perimeter and interior fences at all facilities

Source: Provided by US Army Defense Ammunition Center and US Defense Threat Reduction Agency

depots and recording weapons numbers on paper or, if possible, in an electronic database. Separating the good ammunition from the unstable or the surplus from the operational are further examples of easily done tasks (OSCE, 2003a, ch. VI, p. 3). These tasks were not done in the first place for a number of reasons, but once taught how to do them, a motivated military or police force should have little problem in raising the level of its PSSM practices on its own. Donors normally do not fund projects of this nature, as they mainly involve labour already paid from the host nation’s military budget.

These projects appear to be quite basic, yet are important because of their value and their significance for the rest of the programme. From the donor’s perspective, a host nation’s willingness to carry out these tasks shows its determination to make real improvements in the management of its stockpiles, which in turn can result in greater future investments by donors, i.e. motivated and cooperative recipients are more likely to receive continued support from donors.

Medium-term plans: host country can still achieve much on its own, but donors provide assistance

Medium-term projects require relatively small investments of both time and money by donors. Often these projects involve donor support during an initial stage of purchasing equipment, setting up the project, and providing training. Once those steps are completed, the host nation can implement the plan independently or with minimal support from the assistor.

Medium-term projects are not complete overhauls of PSSM systems, but deal with specific aspects of a host's practices. Providing destruction and weapons-marking equipment, repairing storage units, or even building and installing weapons racks in storage units are all relatively minor investments that can provide direct benefits in response to clear-cut needs. A wide array of actions can be involved in these projects.

A good example of a medium-term project is the marking of state-controlled firearms, which is an important part of sound accounting practices. These procedures have been introduced in many countries in an effort to adhere to international commitments in the UN Programme of Action and Firearms Protocol, as well as regional agreements like those of the Regional Centre on Small Arms (RECSA) and the Organization of American States. The projects seek to establish systems for marking and recording newly imported/exported firearms that are the property of the state. Many states must also log the marking of state defence and security sector firearms and those seized by law enforcement agencies. For these projects, setting up the marking processes is relatively easy and straightforward. An initial investment in equipment—marking machines cost between USD 4,000 and USD 35,000—and personnel training is required to set up the process (Persi Paoli, 2010). Once the equipment and trained personnel are in place, the host is responsible for maintaining the commitment to marking the backlog of firearms (RECSA, 2010). Completing the task will not happen immediately, as weapons are marked one at a time. However, with minimal initial donor investment and continuous host country support of the personnel who handle the firearms and operate the equipment, the project will eventually meet its goal.

Long-term plans: larger financial commitments and greater expertise required

Long-term programmes address large areas of major concern, i.e. massive stockpiles and surpluses. In doing so, they may drastically alter a state's PSSM practices and structures. Accomplishing these goals requires larger financial investments and more time. Everything related to the project is bigger: more involved MoUs, more personnel hired, more contracts, and more money. Critical infrastructure may need to be built. Because weapons and munitions

vary in type and sophistication, many different kinds of equipment might need to be acquired and many different strategies developed. Given the size of these projects, support comes from multiple donors. The initial costs are great, but commitment needs to be sustained over the whole of the programme.

Not all states requesting assistance require programmes of this size. The likely candidates are states with massive quantities and a great variety of aging surplus. The largest PSSM assistance programme in the world is in Ukraine (Griffiths and Karp, 2010, p. 207). In the original plans, 133,000 tons of surplus ammunition, over 1.5 million small arms, and 1,000 MANPADS were scheduled for destruction over a 12-year period. Fifteen nations and the EU contributed funding. The programme was set to run in four three-year phases and cost EUR 25 million (USD 34.7 million) (NATO, 2007, p. 12). Prior to the programme, Ukraine already possessed significant destruction capabilities (Griffiths and Karp, 2010, p. 225). Given the volume of the surplus, the first phase was designed to build a new industrial-scale explosive waste incinerator and a small arms and light weapons destruction facility (Peugeot, 2006). The first phase of the programme was intended to take three years, but due to various setbacks, five years were needed. By the end of the first phase, 1,000 MANPADS, 400,000 small arms, and 15,000 tons of ammunition had been destroyed.⁶

Allocation of financial responsibilities

One of the key agreements during the preparation stage involves determining who will pay for the programme, each one of which has many labour, infrastructure, and logistics expenses that need to be allocated to the appropriate parties. While the assisting party usually pays a larger proportion of the costs, it is not expected to fund it alone. The donor usually pays for large acquisitions or investments, such as major equipment purchases and the revamping of storage units. Donors also cover the fees of the international assisting bodies, along with other project-related costs. Host states are required to provide 'realistic' financial or in-kind support (Courtney-Green, 2007, p. 4), which encourages them to commit to and actively participate in the programme. Hosts often are requested to provide salaried military personnel as labour and to supply government or military vehicles for the PSSM programme. They are also expected to provide security using their own personnel (Threat Resolution Ltd, 2004, p. 5-2).

Transportation, as an example, is a large expense. Weapons and ammunition need to be transported to various depots or demilitarization locations. In many cases, this is done by truck, although trains and aircraft are also used. In some countries, transportation is a massive undertaking. Albania, for instance, transports 50–60 truckloads of stockpiled equipment per day.⁷ This requires trucks, drivers, and loaders. Fuel costs, vehicle maintenance, and parts need to be paid for as well. Funding for these expenses needs to be made available on time, as dictated by the programme schedule, and failure to pay them can cause delays. Therefore, agreements that spell out funding responsibilities should be drawn up beforehand. A typical agreement might require the host nation to supply the trucks and salaries for the drivers and handlers (who are likely already to be part of the military). The assisting nation might pay for fuel costs at a set price, plus an amount for tyres, oil changes, and other vehicle maintenance costs. Donors look for areas where costs can be shared. Using soldiers to supply labour and existing military trucks to transport weapons and ammunition are possible examples of shared costs. Regardless of how costs are split, pre-arranged agreements and pre-assigned responsibilities are essential.

The number of expenditures and their eventual costs can adversely affect programme implementation. Unexpected costs or unclear responsibilities are behind many halts to programmes. National and local taxes are one of many areas of dispute. Responsibility for paying a range of fees arising from taxes or customs charges on fuels should be assigned before programmes begin. Donor governments are reluctant or unwilling to cover these costs. What a host might see as the cost of doing business, donors might view as their being double-charged for providing support. The donor's hesitation can be a result of its desire to maximize aid, its refusal to support host governments with money to use in general funds, its concerns over corruption, or its refusal to pay for an unreasonable expense (UNECOSOC, 2005, p. 5). This issue could benefit from standardized policy. Many donors, for instance, are not permitted to pay taxes to a foreign state. If agreements with the host country acknowledging this are not laid out during the planning process, then serious delays can arise during implementation, resulting from, for example, programme-related equipment being held up in customs. The OSCE, on the other hand, does not have any legal prohibition of this kind, but negotiates on a case-by-case basis. This

may include paying the value-added tax (VAT) at times required, which is then reimbursed by the host government. While there is always the intention to design VAT-free agreements, in reality agreements vary by host country.⁸

Practical measures

With programmes potentially costing millions of dollars, both parties often develop elaborate plans. However, as mentioned, continued donor support depends on successfully achieving the set programme goals on schedule. Therefore, practical goals with realistic timelines are important.

Practitioners on several occasions expressed frustration over host nations' expectations of receiving brand new, state-of-the-art facilities. While fulfilling these expectations would certainly solve one of the security concerns that gave birth to the programme in the first place, the high cost would undoubtedly prevent funding from being assigned to other areas. Furthermore, a one-off expense of this kind would not address the other interdependent flaws in the nation's PSSM system. These kinds of facilities have more often than not fallen into disrepair if they are not integrated into a holistic and sustained improvement plan. The large investment required in developing new depots is often the least efficient solution. Instead, it might be best to refurbish existing depots to acceptable levels of safety, or even relocate some depots at a minimal cost as part of defence planning and military restructuring, thereby freeing up funds for other projects. Prioritizing available assets to meet the most urgent needs is an important aspect to consider. What are the threats? And what is needed to address them? Are low-cost options available that would make the improvements needed to address the perceived threat?

Programme planners should take into account the fact that many countries seeking assistance are in a state of political and economic transition. Factors outside the control of programmes can limit the efficiency of the work. Basic infrastructure may be lacking and major changes in the system of government might occur. It is also likely that major restructuring of the security sector is occurring at the same time (see next chapter). The realities of this transition can stall or delay programmes, which in turn can cause donors to question their continued investment. Targeting specific needs in light of the context is important, as is selling the goals of the programme to all stakeholders.

Starting with highly achievable goals—such as those recommended in the no-/low-cost category (see Table 1.1)—is another recommended approach. Developing a track record of success with the relatively easy tasks builds donor confidence (Threat Resolution Ltd, 2004, p. 4). A failed project can derail an entire programme, so it is important to build a record of achievement. Using this approach allows for the gradual development of skills and capacities in the host nation and among staff. It also allows time for the implementing partners and host to develop trust and a good working relationship. This will often result in better conditions being in place when more difficult parts of the programme are tackled later.

Coordinated effort

Coordination is vital, given the multifaceted nature of PSSM programmes. This is particularly true as the number of stakeholders and agreed-upon tasks increase. Meeting set goals and responsibilities by scheduled times is an important element in maintaining interest in the programme. Well-coordinated programmes create greater synergy and can attract additional support. Donor governments often have vested political interests in particular issues. Canada, for instance, has long been a strong promoter of the destruction of landmines, while Germany has led on cluster munitions and the US on MANPADS. Instead of multiple bilateral programmes, each potentially covering the same stockpile depots, coordinated programmes are more efficient because they reduce the duplication of related tasks. A coordinated project also allows other states that are unable to solely finance a project the opportunity to contribute, thus reducing the burden on all concerned.

Multilateral organizations and agencies (such as UNDP, the OSCE, NAMSA, RECSA, and SEESAC) often coordinate large programmes. One of their roles is to serve as a middleman between host governments and donor nations. They can facilitate contributions from multiple nations for the same programme, which is important when programmes become larger. They can also serve political purposes. Multilateral agreements allow for ‘low-visibility cooperation’ to come about in circumstances where bilateral support might not be possible because of nationalism or for other political reasons (Karp, 2010, p. 195). Often, these multilateral organizations possess considerable institutional knowledge as well, and their managerial and technical support strengthens pro-

gramme implementation and follow-up (Faltas, 2010, p. 84). On the down side, these bodies can add additional costs of up to 15 per cent in some cases. Their multilateral bureaucracy may also slow down projects during the design phase. NATO, for instance, requires a long programme assessment step that gives time for all NATO member states to review and comment on proposed programmes, which delays the start by weeks. Still, the positives of the relationship often make it the preferred option (Karp, 2010, p. 10).

Oversight, along with the initial assessment and programme design, is a key responsibility of the coordinating body. This is to ensure that all stakeholders are fulfilling their roles on schedule. A strong coordinating presence would ideally encourage vertical oversight in the host's PSSM management system as well. For a programme to achieve long-term success, oversight will be needed at each step down the chain of command. The PSSM system will also require continued management once the programme ends if it is to be sustainable.

Finding an implementing partner

The donor or coordinating body hires implementing partners either directly or through a tender process. Contractors can be locally or foreign based and come from private industry, government, or non-profit organizations. Each contractor's experience, reputation, and tender offer are taken into account during the selection process, while any relevant conditions that might hamper the work of a specific assisting group are explored. As mentioned earlier, access is often a major restriction limiting foreign contractors' ability to work effectively. While exceptions can be granted by taking requests to higher legal authorities, this takes time. If local implementing partners exist and are capable of carrying out the programme, then they become the logical choice.⁹

Collusion between the contracted implementer and officials in the host decision-making structure is a concern, particularly when working with local contractors. As one practitioner interviewed put it, '[w]e don't want to buy new Mercedes for the generals'. To prevent such corruption, coordinating bodies carry out background checks on contractors, looking for criminal records and conducting audits regularly. Some also prohibit the subcontracting of any part of the contract awarded.¹⁰ This reduces the ability of local contractors to funnel money outside the project design.

Box 1.1 **Regional cooperation in destruction**

Regional cooperation in surplus destruction and PSSM training is being promoted in certain areas (including the EU, South-east Europe, and the RECSA region). Many of the nations in these regions have similar PSSM problems or matching PSSM needs and capabilities. Transnational agreements can use the equipment and knowledge currently in place and coordinate plans for future improvements. These efforts seek to improve efficiency by encouraging a particular nation to specialize in certain aspects of the weapon and munitions destruction process. This cooperation is particularly useful when dealing with wide variations of munition types. In regions where several countries possess high concentrations of surplus weapons and ammunition in need of disposal, there is the potential to reduce costs by identifying synergies. Ideally, weapons and ammunition could be imported to countries possessing the capability to destroy them. Donors are particularly excited about this possibility, as it would allow them to increase efficiency without duplicating investments in equipment.

Currently, the Regional Approach to Stockpile Reduction in South-east Europe (RASR) initiative is attempting to build a mechanism for cooperation among the various government representatives and assisting bodies: the US State Department, NAMSA, the OSCE, SEESAC, and the Centre for Security Cooperation in South-east Europe. The initiative aims to 'prevent disastrous explosions or destabilizing diversions of conventional weapons and munitions' (RASR, n.d.) by harmonizing regional efforts. Recognizing the common stockpile management problems facing each state in the region, the RASR initiative believes a coordinated programme would improve efficiency and use limited resources far better (Ressler, Diaz, and Freeman, 2009). This initiative is exploring a range of possibilities, such as standardized policy, shared infrastructure, and coordinated training. One major concept being considered is the creation of regional destruction centres. Highly specialized demilitarization plants dedicated to destroying particular stockpile items would receive surplus stocks from neighbouring countries. By creating synergies in the planning, the RASR hopes to maximize each nation's ability to reduce surplus stockpiles quickly and more cost-effectively. Legal obstacles still need to be overcome, as current legislation in some states prohibits state assets from being transported outside of national borders.

Documenting the agreements

Each agreement should be documented to help avoid disputes during project implementation. While this procedure does not guarantee smooth navigation through a bureaucracy or grant open access to storage sites automatically, having a paper trail does at least provide evidence of agreements and define points of contact that are able to facilitate compliance and provide clarification. For the OSCE and NAMSA, the MoU acts as the 'umbrella agreement'

enabling the donor to work with the host nation (NAMSA, n.d.). It establishes the legal and financial mechanisms under which the programme will operate. Also, an implementation agreement specifies each party's obligations towards programme implementation. Additional smaller arrangements are also formalized at lower levels by implementing partners.

The culture of signing contracts is not found in all societies and contractual law is not always fully developed in a particular country. Yet practitioners stressed the importance of insisting on documentation. Delays and setbacks resulting from poor information exchange among vital stakeholders were a common problem. Documentation provides proof of senior-level support to staff working in the field. This process must also consider local cultural norms and attitudes to the binding nature (or otherwise) of written agreements.

Box 1.2 **What to include in an MoU**

The following should be included in an MoU:

- A realistic number of clear and agreed-upon goals with specific short- and long-term outcomes should be specified.
- Realistic time frames should be specified. This sets quantifiable goals to be reached and ensures that funding is made available at specific times.
- The roles and responsibilities of both the assistor/donor and the host state should be clearly spelled out.
- Site visits need to be agreed on. This typically includes the specific date(s) and time(s) when the team can access a specific location. It also should clarify what the team is permitted to do:
 - Are pictures allowed?
 - Can assessors interview workers or the guard force on site?
 - Can locations be marked with GPS on site?
- Reporting requirements, including the frequency and content of reports, should be laid down.
- Points of contact at each branch and organization should be specified, allowing effective liaison.
- The privileges and immunities of the assistor's staff involved in the project should be clearly defined.
- Funding mechanisms, billing procedures, and payment timetables should be laid down.
- The ownership of equipment and organizational liabilities should be specified.

Getting rid of excess: demilitarization options

Demilitarization is one of the key activities of PSSM programmes. It often requires the most financial resources and time commitments, therefore the most appropriate means should be found to achieve it. Demilitarization can be divided into two main methods: OBOD and industrial demilitarization. Most PSSM systems will use both methods; however, each method has its own pros and cons (see Table 1.2).

Open burning open detonation

OBOD is a widely used stockpile reduction method, as it is often the only acceptable option (Threat Resolution Ltd, 2004, ch. 4, p. 4). When properly performed, it is regarded as a relatively safe, quick, environmentally acceptable, and cost-effective process. OBOD is required for munitions that are too unstable for industrial destruction; for surplus propellant and explosive materials; for munitions that are difficult to process safely; where it is not cost-effective to develop an industrial production line; or to prevent the need to transport materials over long distances for processing (NAMSA, 2009, p. 6). OBOD is possible for most types of weapons and ammunition, although it is particularly well suited to munitions and explosives. OBOD requires comparatively less initial investment and can therefore be initiated more quickly. It does require careful attention to safety and environmental regulations, however, thus requiring personnel with specific expertise. Finding the proper site, ideally a military demolition range, is important. Quantity-distance analysis needs to be performed to determine the maximum radius of fragment hazards, blast effects, and shock transmitted through the ground (AASTP, 2006, p. ii, s. 7.21). An experienced explosives expert who is able to calculate the blast effects of a variety of explosives should carry out this procedure. However, once the right detonation sites and transportation routes are found, programmes can begin with few additional resources. The major drawbacks stem from the effects of the destruction process. Residents in surrounding communities often complain of the noise levels and vibrations. They also often express concerns about the health and environmental consequences of the dispersal of metal particles into the air or the leaching of metal particles and chemicals into water supplies.

Box 1.3 **Local challenges to OBOD**

Inevitably, all projects will affect local populations, whether during transportation or because of the presence of civilian housing near depots or destruction sites. Local communities are particularly affected by open detonation, and noise pollution resulting from daily ordnance destruction is a nuisance to many. Environmental concerns focus on the dispersal of metal particles into the air, the leaching of metal particles and chemicals into water supplies, and threats to local wildlife. There is also the possibility of ‘kicking out’ (i.e. dispersing into the environment) fragments and unexploded ordnance.

Local residents react in many ways. Environmental concerns and fear of the possible health impact can mobilize citizens to oppose or demonstrate against surplus destruction. Locals have also attempted to exploit their concerns to achieve financial or political gains. PSSM programmes bring an influx of money into areas often suffering from high unemployment and poverty. Inevitably, some members of the community will benefit financially, whether it is contracting companies, locals employed on the project, or people leasing land for destruction sites. In the past, opposing political parties and competing companies fighting for the contracts have disrupted this kind of work.

The situation in Montenegro illustrates the complex dynamics and multiple reasons for disrupting open detonation. In July 2010 Montenegro began disposing of several tons of surplus materiel through open detonation on Golija Mountain near the Bosnia and Herzegovina border. Detonations occurred weekly, from Tuesday to Thursday, up to four times a day. The location is some distance from tourist and densely populated areas, while the few surrounding houses are considered a safe distance from the explosions. Thick stone plates underneath the site made the location ideal, as they acted as a natural barrier that protected the ground water from metal seepage.

Despite the government’s efforts to mitigate concerns, for several weeks citizens held a series of protests and blockades of transportation routes to the destruction site due to fears of health risks and environmental damage (Rudovic, 2010). While they agreed that surplus disposal was in the national interest, they did not want their municipality to bear a disproportionate amount of the destruction activities and urged the government to divide these activities among several municipalities (Mandic, 2010a).

Misinformation intensified the opposition. Rumours circulated that the items being destroyed contained biological, chemical, nuclear, and radioactive materials. This resulted in additional efforts by locals to block the transportation of ‘dangerous material’ through their mountains and property (Mandic, 2010c). Claims were made that NATO ordnance was also being destroyed or that the work did not meet international standards. Still others claimed that the MoD did not conduct an environmental impact analysis. These concerns were not appeased when the government released test results from the Centre of Eco-toxicological Research that showed no threat to the environment. Local residents said the centre was a government institution, not an independent agency (Bjelajac and Jovicevic, 2010; Mandic, 2010c; RTCG, 2010). It was not clear how many

citizens were mobilized by opposition parties to protest against the actions of the current government and how many genuinely protested to preserve the environment.

The detonations also affected Montenegro's neighbours. People from Bosnia and Herzegovina, located 1.5 km from the detonation site, complained about structural damage to their cisterns and homes and joined the protests (*Trebinje Danas*, 2010; Bjelajac and Jovicevic, 2010). They complained that smoke and ash remained in the air for hours after the detonation and sulphur powder could be smelt in areas over ten kilometres away (Bjelajac and Jovicevic, 2010). The citizens urged their local representatives to take legal measures to stop the detonations. Protests were presented to the Montenegrin Embassy in Sarajevo. However, at the time of writing, the Bosnian authorities had taken no further action.

The Government of Montenegro tried to engage in a dialogue with its citizens. The MoD stressed that the surplus represents a bigger threat to the citizens in storage than through detonations. In an attempt to create greater transparency, a high-ranking state official proposed that the surrounding villages form a common commission to follow the entire process and oversee the destruction (RTCG, 2010). An independent institute was instructed to take additional tests from the soil and water and confirmed that there was no danger to the local flora and fauna. The police cleared the roads and dispersed protesters so that the military trucks transporting the materials earmarked for destruction could access the detonation site. Finally, with US funding and technical support, 300 tons of surplus weapons and ammunition were destroyed in three months before the detonations stopped as a result of meteorological conditions at the detonation site (*SEEBiz*, 2010). The detonations are scheduled to resume in spring 2011, but it remains to be seen whether the outreach attempts and firm action of the police will have a lasting impact.

To address the concerns of local populations, it is important to understand their motivation. Often, problems are due to widespread misconceptions or a failure of the project design to fully consider the project's impact. Providing better information to the local population could prevent some of these issues from arising. This includes candid discussions of the risks that unattended stockpiles pose and the impact of the work on the environment. Practitioners often ask for the involvement of the host countries' MoD in public relations activities.

Community concerns have caused serious delays in the past (see Box 1.3). As a result, OBOD projects often include public relations campaigns. A part of this is air, soil, and water impact assessments conducted by neutral parties. The host government plays an important role in disseminating information to the public. This includes acknowledging residents' concerns and explaining the necessity of the work, which aims to ensure the community's safety. The public must be made aware that the threat from doing nothing about excess, aging explosive stocks is greater than the risks from safely reducing these

stocks through controlled detonations. Pre-emptive outreach campaigns could help reduce some of the animosity felt towards the programme. This includes organizing ‘destruction events’ that involve local civil authorities.

OBOD is often preferred for items that do not justify the long-term investment of building industrial demilitarization capacity. In 2007 the UK MoD explored three options for destroying 45,000 105 mm tank shells: in-country OBOD, reworking the cartridge cases and filling them with new propellant, or shipping the shells to Sweden for industrial demilitarization. When the costs were assessed, OBOD proved the least expensive, by GBP 300,000 (roughly USD 489,000).¹¹ An eight-man team was able to complete the task in six weeks, destroying 1,500 cases a day by using OBOD.

OBOD has the following advantages:

- It is comparatively safe: highly unstable munitions can be destroyed with less handling and risk than industrial processing.
- It is cost-effective: requiring less investment in equipment, OBOD is often a less expensive option, particularly for destroying extremely complex or small quantities of munitions where it would not be cost-effective to develop an industrial demilitarization process.
- It is the best option for eliminating propellants and explosives that cannot be reused.

Industrial demilitarization

This is another commonly used method of making small arms and light weapons and their ammunition inoperable. Many technologies exist, but most involve some form of industrial burning/melting, cutting, crushing, or disassembling techniques. These methods use an assembly line approach, often adapting processes already used by the host’s domestic arms and ammunition manufacturers. A strong demilitarization industry has the potential to be sustainable, because the host nation, and potentially neighbouring ones as well, will need to maintain a healthy stockpile once the PSSM assistance programme has ended. Initial investment by donors is usually needed to get the process started. However, the process provides opportunities to recover some of the costs through recycling scrap metals and explosive materials. For small arms and their ammunition, a demilitarization production line can be very efficient. A giant ferrous

Table 1.2 **The pros and cons of OBOD and industrial demilitarization**

OBOD		Industrial demilitarization	
Pros	Cons	Pros	Cons
Cost savings (less time and capital expense per ton destroyed)	Noise	More recyclable materials produced	Slower in some cases (depending on the processes involved)
Efficient destruction of small explosive components resulting from the industrial demilitarization process	Environmental impact	Local employment	Increased risks: increased chances of accidents by mixing people, machinery, and explosives
Quicker in some cases (depends on the scale of industrial demilitarization)	Waste	Less invasive: noise, shock	Expensive: large capital and personnel expenses
Can be performed by military personnel as part of training	Fewer recoverable metals for recycling compared to industrial demilitarization	Less impact on the environment	Increased management requirements for components after disassembly
	<ul style="list-style-type: none"> • Low-order/incomplete detonations • Schedule delays due to low cloud cover or rain • Kick outs (unexploded live munitions thrown from detonation pit) • The need for range remediation at the end of OBOD • Space requirements to avoid impacting population with fragments of destroyed arms/munitions and soil debris • Less predictable due to low-order detonations and kick outs of live rounds 	<ul style="list-style-type: none"> • No weather delays to schedule • Allows reuse of removed components • Separates hazardous parts from inert parts for final disposition, disposal, or recycling 	<ul style="list-style-type: none"> • More storage requirements for disassembled components • More specialized training requirements for personnel

shredder can destroy 3,000–4,000 small arms per hour (OSCE, 2003a, ch. VII, p. 10), while an efficient explosive waste incinerator can destroy 28,000 rounds per hour (Threat Resolution Ltd, ch. 4, p. C-3). Other items, particularly large munitions, are much more time consuming and potentially dangerous to destroy.

In interviews with subcontractors, the demilitarization of ammunition received less support than OBOD. The complexity of demilitarization projects meant that additional bureaucratic obstacles had to be overcome. Essentially, creating the demilitarization capacity to deal with a range of arsenals required either the retooling of ammunition-manufacturing plants or establishing a new industry from scratch. Machinery had to be imported, labourers needed more training, and recovered metals and explosives had to be processed and sold. Each procedure risked running into complications at the state and local levels that might delay the programme. There was also a perception that the process brought an increased risk of accidental explosions. The combination of these factors made OBOD the easier option. The added value that the host nation received from the creation of a new industry or from funds recovered from the selling of scrap metals and recycled explosive materials was not viewed as sufficient justification.

Industrial demilitarization processes are used for the following reasons:

- They are very efficient when large quantities of the same type of items need to be destroyed.
- They can strengthen the local industrial base and provide local employment opportunities.
- There is greater opportunity to recover and recycle materials, which reduces waste and costs if recycling profits are reinvested in the programme.

Recycling revenue

Value in weapons and ammunition can go beyond their use in protecting the nation that owns them. The materials that go into their construction often retain inherent value. Selling recycled materials from weapons and ammunition can substantially reduce destruction costs and even turn a profit. Metals commonly found in ordnances include steel, aluminum, brass, copper, and lead, all of which can be sold as scrap. The potential is significant. Going back to the UK OBOD example, each of the 45,000 105 mm shells consisted of 2.5 kg

of brass casings. This meant that 1,125 metric tons of yellow brass were recovered from the destroyed shells. Once recovered, cleared of ash and primer metal, and flattened, the scrap metal was transported to the smelter and sold. (Recycling was possible in this case even though OBOD was used, because the ammunition was a larger calibre. Recycling is not cost-efficient with small-calibre ammunition.) After all the costs were included, the UK MoD netted a return of GBP 100,000 (USD 163,000).¹²

The value of many metals has increased greatly over the past decade, peaking in 2007 (Lim, 2008). This fact has not gone unnoticed, as there are a number of recorded incidents of theft from stockpiles. In 2003 looters attempting to steal ammunition with brass shells to sell for scrap in Najaf, Iraq, accidentally caused an explosion in the depot that killed 40 people (Global Security, 2010). In another case, a practitioner working in a former Yugoslavian country noticed that a pile of demilitarized brass casings near a demolition site was growing smaller through gradual theft. At the time, brass was selling in the region for USD 4,300–5,000 per ton.¹³ Both cases revealed concerns over the lack of security for ammunition containing valuable materials.

Explosive materials also are potentially recoverable from many larger-calibre munitions. TNT in particular is salvageable from many munitions. Once rendered and repackaged, it can be used in construction, mining, and demolition projects. The market for explosives, however, is limited compared to that for scrap metal. States with large-scale demilitarization processes will end up with surplus recycled explosives. If no industrial use is found for them, they will have to be destroyed.

Conclusion

Despite the fact that both host and donor states want to secure the host's weapons and munitions stocks or remove excess weapons, dangerous ammunitions, and other munitions, the challenges involved in doing so should not be underestimated. The complexity of PSSM programmes is not so much the result of the technical difficulties involved, because best-practice guidelines and expertise are widely available. Rather, most of the challenges stem from the many variables that can arise during implementation. Among these are the sensitivity surrounding defence assets and the wide range of stakeholders involved.

One common theme running through this chapter involves the vital role that trust plays in determining the success of PSSM programmes. Cooperation must exist and be maintained from the official headquarters level down through all the parties involved with implementation. This comes from having confidence in one's partners. Holistic approaches, for instance, which are seen as necessary for a sustainable PSSM system, require thorough assessments by technical experts. If the experts cannot access all the areas of concern, their analysis will be based on incomplete information. Proper oversight of programme implementation, which is essential if donors are to continue to fund multi-year projects, also depends on trust. At the day-to-day level, trust determines if projects run smoothly or if they experience delays of some kind (accessing depots, scheduling training exercises, etc.).

Proper preparation and careful planning of PSSM programmes are essential for their long-term success. Thorough preparation is vital for developing a well-functioning system in these environments. Taking the time to assess the best approach to meeting the needs of the assisted state is the best way to avoid or overcome those obstacles that cause many PSSM programmes to fail. 📌

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Chapter 2: Implementing PSSM Programmes in Least-developed Nations: The Bottom-up

By Steve Priestley

Introduction

The increasingly clear connection between armed violence and its negative impacts on developmental activities has begun to shape previous perceptions that stockpile management is only a security or military issue. The direct threats to human security resulting from ammunition depots being subject to unplanned detonations and poorly managed government stocks that allow leaks of weapons and ammunition to criminals, armed groups, and terrorist organizations have the potential to adversely affect a nation, including the development of least-developed nations (Keili, 2008, p. 7). These problems are particularly acute in developing countries, especially those engaged in or just emerging from conflict.

In general, the circumstances prevailing in a country requiring assistance to manage its armaments stockpiles and the negative impact of variables outside the scope of PSSM programming add many obstacles. These can directly impede stockpile management efforts and significantly reduce the chances of a capacity-building intervention being sustained. Low wages and lack of support for soldiers and police challenge a programme's ability to improve the PSSM capacity of a large organization such as an army or police force. Poor infrastructure will make moving training teams or personnel to outlying depots and bases extremely difficult. The movement of ammunition or weapons for destruction or to safe centralized storage will present significant problems in terms of both logistics and security en route. Ammunition and weapons are often stored in buildings originally designed for a different use and in a poor state of repair, with doors, windows, and in some instances roofs missing.

Here, in addition to the usual challenges faced with improving the standard of stockpile management in relatively stable nations, the military or police

institutions within which the PSSM programmes operate may not function properly. As a result, PSSM programmes might take place in parallel to other complicated defence and security assistance programmes in the form of disarmament, demobilization, and reintegration (DDR) and security sector reform (SSR). Transitioning security forces might be in the process of incorporating rebel forces into the police service or army as part of a DDR process, which adds personnel who lack the necessary levels of education and receive minimal training and equipment for their new role. Ethnic or tribal splits are common within government institutions and can hamper any planned training or destruction activities (e.g. by marginalizing certain key commanders who need to be involved). These challenges further complicate the already difficult obstacles discussed in the previous chapter.

The present chapter will discuss some of the issues that practitioners face when implementing PSSM programmes in least-developed nations. While many of the challenges are similar to those faced in other countries, least-developed nations pose additional challenges. For example, arsenal size and condition, infrastructure, and military and security training can be very different to that found in some former Soviet states. While best practices still apply, additional challenges arise during programme implementation. It must be noted that real examples are used on several occasions in the chapter in order to illustrate the actual conditions and problems that have occurred. In some cases, these examples are presented anonymously in order to avoid shaming, embarrassing, or angering the countries concerned. The examples are meant to represent opportunities to learn from past shortcomings and failures in order to improve future programmes.

Coordination and national coordination bodies: linking in with security sector reform

The establishment of a national coordination body (NCB), national focal points, or national commissions is central to implementing the UN Programme of Action (UN, 2001, s. II.4). In the process of encouraging coordination and planning activities, an NCB should ensure that overlapping projects are avoided, gaps are not missed, and assistance is provided with maximum efficiency and effectiveness (Maze, 2009, p. 4).

The variety of organizations supporting and implementing small arms control-related activities in a country can range from the army and police forces from the country concerned to bilateral military assistance personnel, UN bodies, contractors, international NGOs, and civil society. Unfortunately, in many affected countries (even those that have developed a national plan), regular meetings of all concerned agencies do not take place and there have been instances of different agencies implementing very similar activities in the same country. A contracting agency should therefore proactively find out what other projects that may impact on its activities have been completed, are ongoing, or are planned, and PSSM projects should link into and be aware of other SSR and capacity-building projects being conducted (or planned) with the military or police force in question (Claveau, 2010). Assistance packages covering aspects of SSR and capacity building may contribute to supporting the sustainability of a stockpile management project.

In one country, two related yet separate projects were under way simultaneously. One involved a police armoury assessment, survey, and renovation project that needed to establish the locations of police firearm storage facilities and carry out a census of police personnel at each location. At the same time, a project to carry out a census of police officers, establish their normal duty station, and issue them with identity cards was also under way. Each of these projects therefore gathered information that was extremely useful to the other. However, because different governments were funding them, they were implemented by different agencies who liaised with different parts of the police force, they were seen as having different focuses (one weapon management, the other rule of law/SSR), and they reported to different local coordination structures. It was only because one donor in-country took the initiative to make itself aware of all the other projects relating to SSR and the police that the two projects were introduced to each other. As outlined in the UN Programme of Action (UN, 2001, s. II.4), establishing an NCB is therefore a key pillar of PSSM programmes.

Growing trend towards operational implementation

Many affected countries have national focal points for small arms and light weapons issues in place, are possibly supported by regional legislation and

treaties, and are usually members of a regional organization. However, many of these organizations have previously focused on issues relating to treaty adoption, compliance, advocacy, and awareness raising in relation to small arms and light weapons issues. They are experiencing a growing pressure from donors to focus more on operational issues, but find this demand difficult to respond to, frequently because they do not have staff with the technical knowledge that allows them to implement or project manage stockpile initiatives themselves.

Stockpile management projects can be relatively cost-effective, as the main expense will usually be the deployment of a suitable expert to either conduct training or oversee remediation and destruction activities. Costs can rapidly increase if large-scale construction and renovation activities are implemented, but as mentioned in Chapter 1, significant improvements in safety and security can be achieved by a suitably qualified and experienced individual working directly with the relevant agency in its armouries and depots.

This approach is very different from that of large-scale donor-funded projects designed to raise awareness around issues of stockpile management. At present, a project of this type is being implemented at a cost of GBP 3.5 million (USD 5.7 million) over a three-and-a-half-year period. For the same amount, five stockpile management experts could have been deployed over the same period to implement training, destruction, and the installation of security upgrades with a budget of GBP 100,000 (USD 163,000) per annum each. Which project will have the greater long-term impact on stockpile management and small arms-related issues is open to debate, but the latter option could have produced a large number of long-lasting tangible outputs.

Opportunistic approach

Although interventions relating to PSSM need to be strategically planned, some situations benefit from being opportunistic and flexible. Several successful projects came about as a result of donors capitalizing on the unforeseen willingness of a government or army to implement PSSM activities. This is most likely to occur in places with less vertically structured strategic defence and security planning systems, and can do so for a range of reasons. However, propitious conditions of this type can change very rapidly. The people involved

in decision making may change, the security situation in a country could worsen, or unplanned depot explosions and leakage may occur. Similarly, donor priorities may change or other events such as natural disasters or conflict elsewhere in the world could cause the reallocation of planned funding. To a certain extent, programmes should be willing to explore options and take advantage of opportunities while the conditions are right.

These opportunities are more likely to arise in least-developed nations. This can partly be explained by the fact that internal communication between capital and field locations are generally weaker. As a result, projects tend to involve smaller-scale activities and finances.

Weapons and ammunition seized during a peacekeeping operation in the Horn of Africa contained relatively advanced weapon systems that the peacekeeping unit concerned did not have the training to destroy safely. In addition, the weapons and ammunition were stored in the open in the unit's main camp. This meant that the risks of spontaneous detonation due to climatic conditions or if incoming insurgent fire hit the stocks were very high. In addition, the security conditions in the camp were not ideal. If the peacekeepers were forced to evacuate their camp due to an attack, there was a high risk that the ammunition and weapons would again fall into the hands of the insurgents.

Given the perceived urgency of the threat, plans were quickly made. The Mines Advisory Group (MAG) (an NGO supporting PSSM programmes on behalf of donors) was available to provide technical support and put a team on the ground to oversee the destruction and conduct destruction training. Donor funding was available and the donor was ready to allocate it quickly. All that remained was the submission of a detailed statement of works listing the items of concern that the contractor should deal with. Political infighting at the camp level, however, halted all progress. Requests to the camp authorities for the information that was required dragged on over an 18-month period and still did not produce a response. The requests took the form of emails and, on several occasions, face-to-face meetings. During this period of delay, it was alleged that some of the peacekeepers had sold seized weapons and ammunition to the insurgents. What turned into a serious diplomatic and security incident could have been avoided if the data necessary to develop a statement of works had been released earlier. Why this failed to happen was

never made clear. However, on occasions individuals and organizations have been over-cautious when taking programme management decisions despite the harm this has done to stockpile management programmes.

Capacity building and training

Capacity building is often a part of foreign assistance programmes to developing countries and training packages provided through military-to-military cooperation. It includes a wide range of activities, but, according to UNDP, all involve supporting four major 'levers of capacity change': institutional arrangements (i.e. how an institution like a police force is organized and operates), leadership, knowledge, and accountability (UNDP, 2009, p. 43). However, some of the key lessons learned from various interventions reveal that PSSM assistance programmes do not always address each of these four sectors. In particular, capacity building is more than just a question of training individuals, but also includes the development of organizations, institutions, and legal frameworks. Improving these key areas creates an environment in which the capacity built and developed is sustainable and able to continually improve and respond to any threats and challenges that may arise. This issue is frequently overlooked or proves to be unmanageable, as it involves close collaboration and openness with foreign militaries and/or police forces.

Developing capacity in an individual or team is relatively straightforward (see following section). However, newly trained personnel attempting to apply their skills in a dysfunctional system or institution are unlikely to achieve the required standards. If, for example, the logistician fails to order the fuel needed to run the generator that powers cutting shears, then the personnel trained to use the cutting shears will be of little use.

PSSM programmes require competencies to be developed in a number of institutions, ranging from the training of national staff to providing training and capacity building to external agencies such as national mine action authorities, the police or military, and other NGOs. With experience, many lessons have been learned. The most important one is the realization that to be sustainable and effective, training in post-conflict and developing countries must be tailored to the pre-intervention competency levels of those being trained.

Communicating your message

Trainers need to understand the skills that their students possess before training starts, including their level of literacy and education. This should guide the training in order to ensure that important lessons are learned. For example, during a mine clearance course, trainers should make sure that they are providing information in a form that the students will understand. Does, for instance, telling students that a certain type of mine contains 75 g of TNT really help them understand the threat? Or will they understand better if it is explained that it will blow their legs off below the knee, as opposed to at the ankle? The latter more tangible and vivid example might give them a better understanding of the point that is being communicated. This approach uses several 'layers' of progressively building knowledge to get students to the required level.

Certain topics are more difficult to grasp, regardless of the education level of the students, and it can take several months for trainees to develop a basic level of proficiency (Bevan, 2008, p. 65). So programmes need to allot a realistic period of time to train people to develop particular skills. Often this includes the need for them to unlearn old practices. In many cases, what little training people may have had will probably have been done verbally and 'in-house'. In the area of ammunition management, this may mean that even those who are familiar with or accustomed to handling munitions may need to relearn basic practices. During a MAG visit with a donor representative to view ammunition items awaiting destruction, the host nation's senior army ammunition technician repeatedly misidentified various types of munitions and handled the ammunition in a very unsafe way (a submunition was identified as a 'bomb fuse' and some highly sensitive items were roughly handled and even dropped). This technician was responsible for training other members of the logistics corps in the region in stockpile management.

Communicating lessons effectively can be a significant challenge, often requiring lessons to be given through a translator or interpreter, which will double the time taken to present a training course. Also, certain words and examples can confuse the students or are very difficult to translate. As part of the training course design, these issues should be identified and thought through. Generally, exporting and presenting a standard NATO-style stockpile management course is unlikely to be effective or sustainable.

Learning about the normal working environment

Training courses must be tailored to the local context, otherwise trainees will spend time learning skills that will be irrelevant to the situations they will face. Given the limited time for training, this could mean that areas of real concern or potential danger are neglected or not properly covered. There is also the danger of disillusioning the students. One training guide used by NGOs and a national authority in Central Africa was developed by the Canadian military for training Canadian forces on bomb disposal methods. The course included details of a remote-controlled bomb disposal robot. None of the trainees was ever likely to encounter one of these robots. And explaining that robots are used in some countries to protect their bomb disposal experts can damage morale; it can also create frustration regarding the level of support and equipment trainees will receive in their work once they are trained.

Best practice should broaden students' knowledge and encourage their professional interest, which are key aspects of ensuring sustainability. However, what will be covered in a course and what is irrelevant should be decided on before the course starts. In the same course that the robot example was used, students were shown how to complete a notice to airmen (NOTAM)¹⁴ form and told to file it with the relevant airport. During stockpile destruction, NOTAMs are filed to keep aircraft away from areas where ammunition is being destroyed, which would endanger their safety. In Europe and North America, this works well, as there is an established and efficient air-traffic control system. Over most of the African continent, however, there is no effective air-traffic control system and local airstrips are not equipped with proper communications equipment. Something that would be taken for granted in a European or North American stockpile destruction training course becomes a major safety challenge in certain countries and operational environments, requiring much more tuition time and explanation.

Ensuring that training is appropriate, relevant, and sustainable seems like common sense; however, other motives can influence those who deliver training and the type of training given. This includes what is often the primary purpose for conducting the training, i.e. improving diplomatic relations rather than ensuring that stockpiles are properly managed in the long term. Similarly, a donor may insist on the training being provided by an agency from its own country as a public relations exercise to boost its image, even though this agency

may not have the required level of skills and expertise. These issues can undermine the long-term success of the training project.

Less than ideal motivations for carrying out capacity building and providing funding are not unique to PSSM. However, it is vital to recognize the impact of small arms on regional and global security, specifically their capacity to inhibit the achievement of the UN's Millennium Development Goals. The fact that they are one of the main instruments of global armed violence should be borne in mind when designing and delivering capacity-building PSSM programmes and allocating the human and financial resources required to do so correctly and sustainably.

Who to train: appointing relevant people to receive appropriate training

One positive aspect of training in developing countries is that the vast majority of people are keen to receive formal training and gain recognized qualifications. However, this can lead to nepotism or favouritism. The people who are most in need of training to perform their core day-to-day duties may have their places in a course given to others with connections or in positions of authority. Obviously, capacity building is useless if it is provided to the wrong people. While there is a need for senior commanders and those who will be managing armourers and ammunition depot staff to understand the issue and be able to carry out the required management checks, this should not be at the expense of the people who will actually do the work.

One possible route to 'deconflicting' this issue is to plan a programme based on job competencies: what does a person in a certain post need to know and be competent in? Analysing skills requirements, from the level of a private soldier working as an assistant in a depot through to senior commanders requiring a strategic understanding of stockpile management throughout the country, is a way to identify who receives a particular level of training. A certain level of overlap to allow people to 'manage up' and cover key aspects of the post above them if personnel are sick or absent can also be incorporated into this methodology.

Long-term commitment to trained staff

Although it is difficult for any organization to predict its future human resource requirements and staff movements, these factors affect training programmes.

Often, trained staff are transferred or relocated to posts where their new skills are of little use. This is particularly true if they are transferred before they can pass on their knowledge to their replacements, resulting in a loss of institutional knowledge.

Often the relocation of people is unavoidable, but in many cases it could and should be dramatically reduced. More and more donors and capacity-building organizations require in a contract that people who have been trained should stay in their posts for a minimum period of time. MAG, for instance, requires that staff it has trained stay in their posts for at least two years. This reduces the need for constantly 'going back to square one', which prevents capacity building from progressing beyond basic levels. This contract should ideally be signed before training starts. Once basic skills are taught, it is important to develop the internal capacity and processes necessary to train new staff if people are relocated.

Technical training and leadership/management skills

With well-designed and properly delivered training, it is possible to train people with relatively low levels of education, literacy, or previous experience to perform tasks up to international standards such as managing an armoury, storing MANPADS securely, or destroying surplus weapons and unsafe ammunition. Ideally, skills taught during training should be reinforced with on-the-job training for a period of time. This helps students to apply the operating standards they have been taught in their normal working practice.

Where practitioners continually face challenges is in the development of leadership skills among middle and senior managers. This is necessary in order to maintain the standards taught through training. Many of the skills required to be a good manager and leader are not easily taught, while the environment in which someone works affects whether they are able to do their job properly. If chains of command do not exist or function badly, then it is difficult to maintain accountability. The willingness of junior staff members to do their jobs properly is a reflection of the example set by their co-workers and those who manage them, as well as their personal values and ethics. Poor working practices and morale killers such as low salaries undermine all of this.

Technical capacity building needs to be supported by wider institutional reforms if it is to be sustainable. While technical training and the building up

Box 2.1 **The dilemma of whether to pay national soldiers**

Private soldiers in least-developed countries where PSSM training occurs receive low salaries and are sometimes paid several months in arrears. Often soldiers have second jobs or spend the majority of their time on duty cultivating crops to feed themselves and their families rather than carrying out their military duties. To achieve high rates of demilitarization of weapons and ammunition, or to deliver training in a realistic time frame, a 30–40 hour working week is the norm in PSSM projects. This can cause several challenges for the soldiers seconded to the programme. This level of commitment means they will have to spend more time ‘at work’ than their colleagues. Given the danger inherent in their training, they will also be required to perform to a higher standard. Yet donor principles dictate that most of them do not receive an increase in salary to compensate them for the fact that they will no longer have the time to cultivate land or take on a second job. Problems arise, however, if donors pay serving soldiers in foreign armies. At the same time, providing a living wage or package to military personnel who carry out PSSM activities improves their efficiency and effectiveness and increases the retention of trained, competent, and experienced technicians. It is therefore in all parties’ interest to find a solution to this problem.

If donor regulations prohibit direct remuneration of soldiers from a foreign army, other alternatives can be used that address the issues raised above and improve the efficiency and effectiveness of the project. Some organizations have used loopholes allowing daily allowances to be given to soldiers during training.¹⁵ Providing potable water will help soldiers to stay healthy and thus they will spend less time off sick during the project. Providing a hot meal during the day also improves attendance, increases the time spent at work, and ultimately improves productivity.

of competence can happen relatively quickly, establishing the right institutional and organizational environment to support and sustain them does not. While leakage and diversion of weapons and ammunition and unintentional depot explosions mean that there is an urgent need to provide technical training and capacity building, this process can only work properly and be sustainable if wider training and support are also provided.

Storage facilities

The quality of ammunition storage facilities can vary enormously not only from country to country, but also among a capital, provincial headquarters, and remote bases. In least-developed nations, these facilities can be in remark-

ably poor condition. Instead of cold war-era structures, many of the poorest nations' largest depots are left over from the colonial era, and now require maintenance, repair, or complete overhauls in addition to security upgrades. In particular, conditions deteriorate outside of capital cities. Bulk ammunition is frequently stored in makeshift depots made from buildings intended for other purposes. Former schools, warehouses, or even improvised structures made of mud bricks (see Figure 2.1) or wood are used, as they are often the most solid structures in the area. Clearly, stores of this type fall well below the safety and security standards of international practice.

The presence of large numbers of people near storage facilities is a source of concern in many places. Thriving communities may have developed right on the doorsteps of many of these remote depots. Although they are often poorly paid, soldiers do earn an income, which is a rarity in some of the more isolated areas. As entrepreneurial civilians follow to provide services to the soldiers,

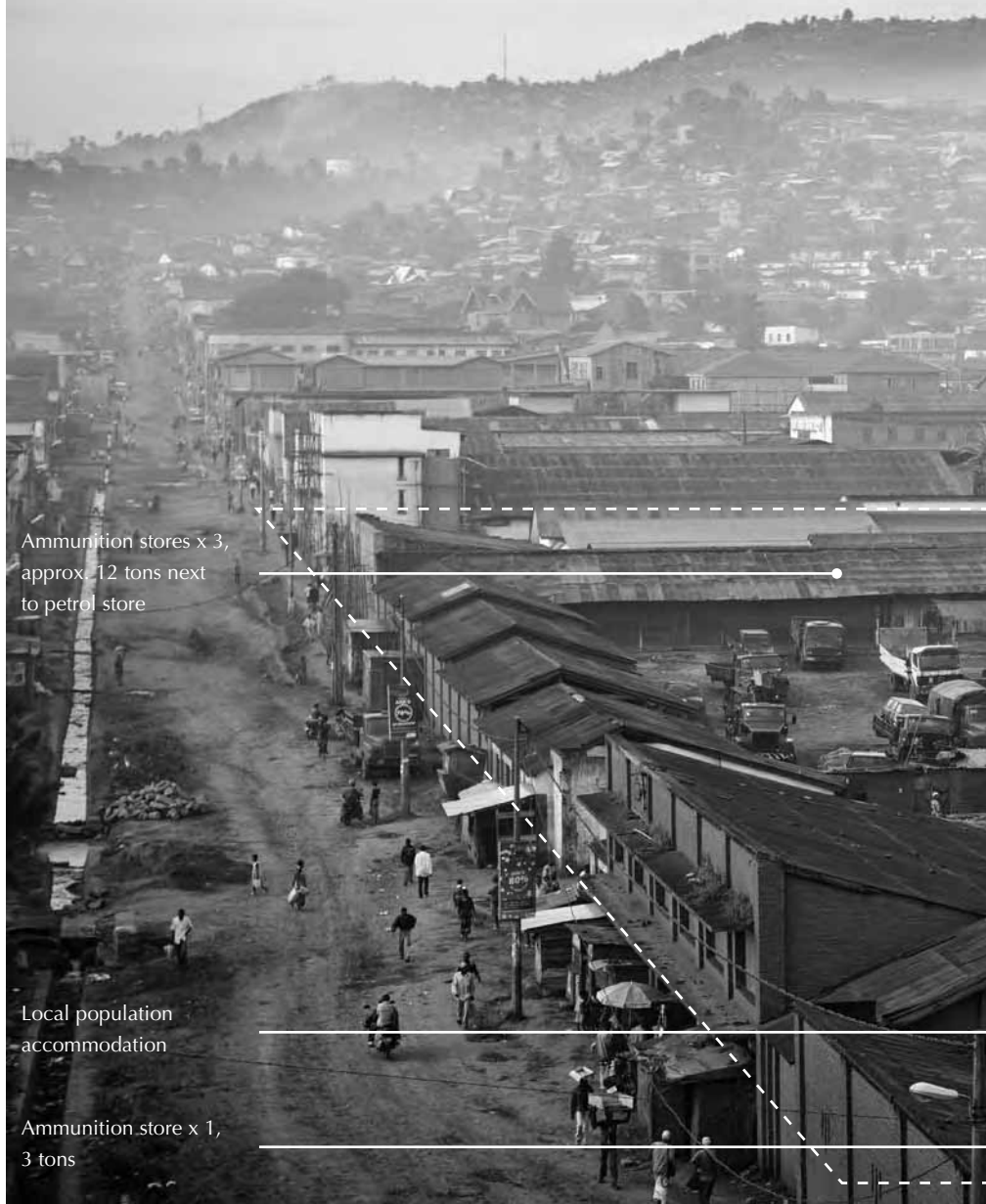
Figure 2.1 **Remote munitions storage depot in Sudan**



Source: Courtesy of Sean Sutton/MAG

Figure 2.2 **Population surrounding a military depot, Bukavu, DRC**

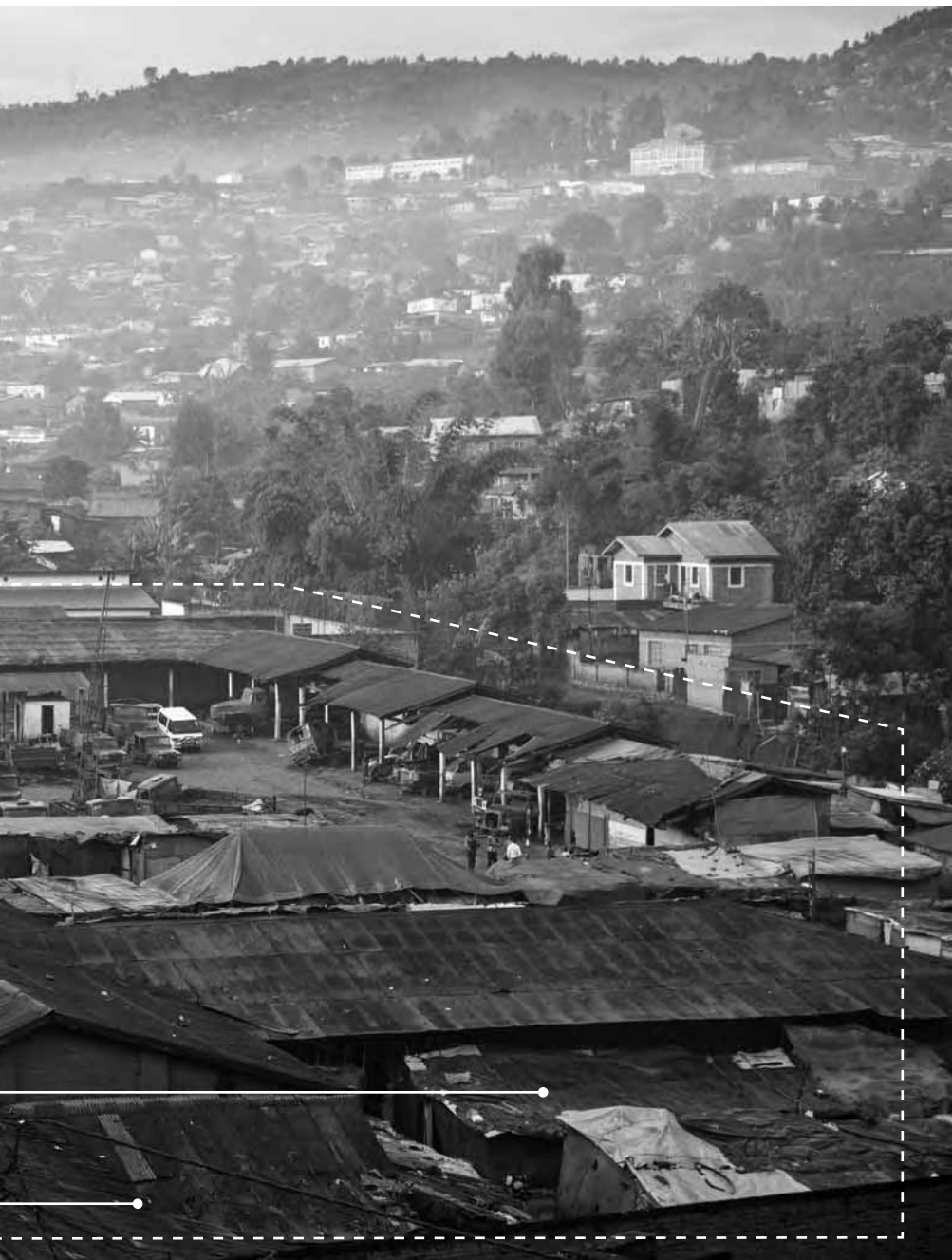
Source: Courtesy of Gwenn Dubourthoumieu/MAG



Ammunition stores x 3,
approx. 12 tons next
to petrol store

Local population
accommodation

Ammunition store x 1,
3 tons



depots in turn become a centre of the local economy. Soldiers' families also frequently live on camp. The presence of civilians increases both the number of people potentially affected by a disaster and also the likelihood that a disaster occurs (Anders, 2009, p. 3). Figure 2.2 shows a community that sprang up around what was once a remote depot. The presence of civilians in and near the compound and numerous poor PSSM practices make a potentially lethal combination. In this example, bulk fuel is stored with ammunition, while the soldiers' families use open cooking fires nearby. Each of these factors increases both the likelihood and the potential severity of an accident.

Military and police personnel managing stocks of weapons, ammunition, and explosive have not necessarily been provided with any specialist training to carry out their duties competently. Shortages of basics like pens and paper can mean that inventories may not be kept and there is often no knowledge of what a depot or store contains and therefore no way of identifying leakage from it.

Basic safety requirements for the safe storage of weapons and ammunition may also not be understood. MAG has assessed ammunition depots in several locations where the personnel managing the stores concerned smoked in them, rubbish and flammable materials were allowed to build up, and explosives were fused with safety devices removed.

This lack of knowledge of good practices goes up the chain of command. Senior police officers have initially rejected the idea of installing gun racks to provide security (by locking the weapons to the racks and removing ammunition and storing it separately) and allowing weapons to be accounted for by keeping all of them in one place, having felt that hiding weapons in several parts of the barracks would make it much harder for thieves to locate them and keeping weapons loaded with several magazines taped to each one would allow a 'rapid response'.

The purpose of these examples is not to shame the countries and people concerned, but to demonstrate the 'starting points' for PSSM training programmes attempting to assist these countries. Despite these conditions, operations to date reveal that significant improvements in safety and security can be achieved relatively quickly and cost-effectively. This is normally achieved by deploying trained technicians with an understanding of practical measures that

can improve safety and security. They are able to assess depot or armoury conditions on the spot and discuss the situation with the personnel who manage them. Basic activities such as tidying up the facility, removing rubbish and unsuitable items, reorganizing the store, inspecting certain munitions, and conducting a basic inventory can dramatically reduce the level of threat at depots. To be able to implement activities like these that improve security and reduce levels of risk, a state needs to give the technical personnel who are providing the training full access to storage sites.

Access

As discussed in Chapter 1, accessing a country's ammunition and weapon storage facilities is always a sensitive matter. It is the most frequent cause of delays in implementing PSSM assessments and projects, and in some cases causes their complete cancellation. The problems can range from the unwillingness of senior officials to allow access to difficulties in communicating permission throughout a chain of command when access is granted.

In activities of this type, all parties involved require high levels of trust and mutual respect, and a clear understanding of the aim and objectives of the project. This understanding needs to be created from the initial contact and maintained throughout the life cycle of the intervention.

While good briefings can clearly inform the people involved of the project's aim and objectives, trust and mutual respect will have to be earned and developed. This can occur in a number of ways and may involve initially accepting lower levels of access. Certain stores that the host nation deems to be 'sensitive' might require special conditions. In some cases, these facilities can be assessed at the end of the project or only accessed by personnel from the host country who have been given theoretical and practical training during the early phases of a project.

For example, one army that MAG worked with refused international staff access to certain facilities. It stressed that its own troops would decide which items of ammunition were unsafe and required destruction. Although not ideal, this did create a starting point for the project and provided a training opportunity. Working with MAG, the army technicians concerned could be questioned and coached to try and ensure that all unsafe items were removed. This also

allowed for these technicians to be trained to check the serviceability of particular items, especially those that might appear to be 'okay' even when not. If access is restricted, a degree of uncertainty will remain as to how safe a stockpile actually is. Therefore, arrangements like the above example should be seen as a temporary step to allow greater engagement and enable trust to be developed between the parties with a view to gaining full access in the future.

Importance of a good liaison officer

A good liaison officer from the host nation's armed forces can make or break a PSSM project. No matter how much planning and preparation are done, how efficiently access permissions are disseminated, and how many briefings are held explaining the project's objectives, all with the support of senior commanders both centrally and regionally, a time will come when assistants arrive at a depot or armoury and the local commander will have had no notice of their arrival and no idea of what the project is about, and like a doorman at an exclusive nightclub, is adamant that 'you're not coming in'.

In situations like this, a competent and confident liaison officer with the necessary rank and a good knowledge of personalities in the regional command structures will be key to gaining access and being able to continue with the planned activities. Experience has shown that soldiers with the rank of captain and major experience are the most successful. They are well known within their own command structure and have enough authority to gain access to commanding officers in other units. In other cases, strong candidates come directly from the presidential administration. However, the soldiers who will make good liaison officers will have skills that make them likely to be in demand in their own units, which can make seconding them difficult. Officers assigned to this duty must be released from their day-to-day responsibilities in order to fully devote themselves to the role of liaison officer throughout the life cycle of the project.

Liaison officers also require training and they need to be briefed fully on the project, its aims and objectives, the organization implementing it, and the personalities involved. Knowledge of local and tribal languages is useful, particularly when working away from the national capital.

Dealing with false expectations of new equipment and storage depots

Briefings for senior officers to raise their awareness of the issues surrounding poor stockpile management inevitably demonstrate the 'state of the art' of certain security measures (CCTV, biometric access systems, etc.) to demonstrate the vulnerability of the country concerned. This will automatically lead to false expectations that all depots will be rebuilt to top international standards, huge amounts of resources will be targeted at a particular country, etc. In practice, it is always made clear that these are examples of systems used elsewhere and no promises of this level of support are made or inferred. Behind many of these expectations of developing countries lie general misconceptions of how donors operate, including the belief that large budgets are available and that 'all aid is a donation'. However, projects of this type are contracts with specific legal conditions, outputs, outcomes and impact, and accountability that bind all parties concerned and form the basis on which the project is designed and implemented. Many key personnel in host countries do not realize that the donor concerned will monitor the project throughout its life cycle and may stop it at any stage if not happy with its progress. This is why the host country must be able to justify any requests for new buildings/equipment in terms of their long-term usefulness.

During initial contacts and project design, it is essential that the beneficiary country should fully understand what kind of support is being offered. Developing the project as a joint activity can help to clarify the extent of the host country's contribution and responsibilities. As mentioned elsewhere in this report, the best way to increase support in the future is to ensure that stockpile management projects have as few snags as possible and meet or exceed their contracted outputs.

Improvisation and making the best of the resources and budget available are also good ways of attracting future funding. This can range from ensuring that guards are present, properly equipped, and well managed to improvising temporary armouries or explosive stores using converted shipping containers. This is not ideal, but the willingness to do this is a clear indication that the nation concerned is serious about making safety and security improvements (see the discussion of short-term steps that a host country can take in Chapter 1).

Weapons and ammunition destruction

It is almost certain that any PSSM project will involve the destruction of surplus, time-expired, redundant, or unstable weapons and ammunition. Various destruction methods can be used, each with its own pros and cons (see Table 1.2). However, from the experiences of PSSM programmes in various countries and regions, destruction efforts can have two unsatisfactory results. Firstly, weapons are not made unusable or unrepairable; and secondly, munitions are not properly destroyed. The first result could mean that the weapons fall out of state control. The second can result in the creation of large hazardous areas containing unstable and partially destroyed ammunition and explosives that are frequently in a more hazardous state than before the destruction was attempted.

The burning of weapons *does* have a huge symbolic significance and sends a clear message that the weapons will not be placed in a store for possible future use and not sold or given to third parties. However, in several countries, practitioners came across ceremonially burnt weapons that have later been repaired. The heat of the fire is usually not sufficient to destroy the metal working parts of the weapon (see Figure 2.3). Homemade weapons are difficult to make without specialist machine tools used to produce breeches or trigger mechanisms. But if a weapon's working parts are still intact, a new hand grip and butt are easily fabricated from wood. Symbolic burning therefore needs to be followed up by cutting to international standards to ensure that the weapons cannot be repaired or cannibalized.

Figure 2.3 **Burnt R4 rifles**



Source: Courtesy of MAG

Ammunition

Ammunition is designed to detonate, and making this happen is not difficult, especially with ammunition that is old and has been poorly stored, as the large and increasing number of accidental ammunition depot explosions clearly demonstrate. However, effectively destroying bulk ammunition and explosives with a high level

of confidence that the explosives are rendered harmless is a much more challenging task. Two issues are of concern. Firstly, ammunition can be armed during the detonation process, which can lead to the uncontrolled firing of its own propellant. Ammunition frequently has internal safety devices that require acceleration or rotation for it to be fully armed. During a demolition, this can occur if items are not properly arranged, leading to their dispersal over a wide area in an extremely unstable and dangerous state. The second danger comes from the scattering or 'kicking out' of munitions that still have unused explosives. An explosion creates a 'detonation wave' that travels in all directions, similar to the ripple that spreads across a pond when a stone is dropped into it. Training or supervision is required to ensure that most of the blast wave is directed towards the ground, passing through the items to be destroyed and ensuring that they are completely vaporized and not projected outwards.

Items such as rockets should be arranged in such a way that the rocket motor is destroyed at exactly the same moment as the warhead, otherwise there is a danger that the item will launch and could travel a considerable distance. On one occasion, dignitaries and members of the media invited to attend the destruction of surplus ordnance had to take cover as poorly arranged items from the demolition were projected towards them (Ondoga, 2008).

White phosphorous

The many different kinds of munitions create a number of challenges for those planning their destruction. It requires the ability to recognize the various types of ammunition and knowledge of safe handling and destruction techniques. Munitions containing white phosphorous (WP) present a particular problem (IRIN, 2009). Due to the fact that WP spontaneously ignites on contact with air, these items are usually identified as unstable. They should be destroyed during stockpile assessments because the seals that prevent the ingress of air from reaching the fuse will degrade over time, leading to the spontaneous combustion/detonation of the item.

Special precautions are required when handling and destroying items containing WP to ensure safety and minimize environmental pollution. In one case in Central Africa, a demolition range was left with partially destroyed 120 mm WP mortar bombs littering the surrounding area following a destruc-

Figure 2.4 **Failed attempt at destroying mortar rounds containing white phosphorus**



Source: Courtesy of Steve Priestley/MAG

tion effort (see Figure 2.4). This error occurred even though the destruction process involved technical advice and support from a foreign country. These mortar bombs presented a hazard to civilian pastoralists who used the area and any teams sent to remove them. The residual WP will spontaneously ignite when exposed to air, for instance when soil and debris are removed by a team attempting to clear up the area or locals trying to salvage scrap metal.

Delays in imports

Although stockpile management projects generally do not require large amounts of goods to be imported, they have been delayed because of the time it takes to import specialist equipment for cutting and marking. Delays are particularly common with explosives and explosive accessories (which are subject to stringent export licensing and controls). Delays during the importation of non-explosive items and equipment have generally occurred during customs clearance in the country receiving the assistance and are often linked to demands for tax on the equipment. The support of the donor embassy, the UN, or the government ministries receiving assistance is key in these circumstances as they can normally provide a consignee address that will ensure equipment is cleared quickly and is not subject to tax.

Ironically, legislation and licensing requirements designed to make the illegal movement of weapons and ammunition difficult can also affect stockpile management projects that are also designed to tackle this problem. The movement of explosives will require the necessary export licence from the manufacturing country, while the recipient will require an import licence. In some instances, a contractor will also require permits and licences from its home government, even though the explosives never enter or pass through that territory. The main way of reducing delays is to ensure that licences are applied for as soon as a project looks likely to proceed, suppliers are identified and contacted well in advance, and orders are placed as soon as possible.

Sustainability of the programme

In order to be sustainable, PSSM programmes need to be seen as a long-term effort by donors and host nations. If mines or unexploded bombs affect a country, with proper assistance eventually these explosive devices will be cleared and the problem will cease to exist. In contrast, as states have a sovereign right to defend themselves and their citizens, they will hold stocks of weapons and ammunition that may have been acquired to deal with a threat that has long since disappeared. This means that many states have a backlog of surplus weapons and unsafe or expired ammunition to be destroyed. Other stocks of munitions will continue to deteriorate and new items will be purchased that one day will also require disposal. Therefore it is highly unlikely that PSSM support and training will be a 'one-off' intervention.

The key factors likely to adversely affect the continuing success of a PSSM capacity-building project will probably come from outside the immediate project itself. No matter how well trained they are in PSSM, soldiers who are either poorly paid or who receive their salaries several months in arrears are much more likely to sell weapons and ammunition under their control.

How programmes can be successfully handed over

Some capacity-building projects focus on setting a time frame for the handover to host government management, often before the project has even begun. This approach decides on an arbitrary time based more on donor funding cycles

than on the need for the programme to stay in place until the goals are achieved. Another approach could be to define the criteria indicating that external support is no longer required and then work towards achieving them. This is particularly true if an organization requires other reforms and improvements beyond just the PSSM project. In such circumstances, a decision may have to be made to continue to provide a certain level of external support to help maintain standards while wider reforms and changes are undertaken rather than completely handing the project over to local management. This is particularly necessary in an environment where it will be extremely difficult to maintain the standards taught during training and the real danger therefore exists of standards returning to unacceptable pre-training levels.

Where the required level of competence that will permit the handover has been achieved and it is clear it can be maintained, experience shows that the handover should be carried out in phases, possibly over several months, rather than all support being withdrawn at once.

Refresher training

To ensure that standards are maintained once handover has taken place, follow-up support visits should occur at regular intervals (possibly after three and six months). This is an opportunity to review standards, see if any new issues have arisen, and provide ongoing advice and support.

As we have seen, PSSM is not a one-off issue like mine clearance. It is inevitable that over time there will be a need for refresher training to ensure that knowledge has been retained and practices are still implemented, and that there have been no major changes within the country itself, like an increased security threat, the introduction of newly acquired weapons systems and ammunition, or a restructuring of the police force or army.

External evaluations using the method known as quality assurance (QA) are a good way to maintain standards taught during formal training and ensure that systems and operating procedures are adapted to changing circumstances. This process basically consists of auditing all aspects of the programme to see if key lessons learned are being implemented correctly. It is also a good opportunity for the agency/country that received the training to demonstrate that the capacity-building investment made by the donor is still on track and for

the donor to assess whether the agency or country should receive future support. Since in many areas regional bodies coordinate PSSM activities designed to improve standards, developing a regional capacity to implement and conduct QA visits could be a sensible and logical way of ensuring that the time and money invested in training are not wasted and the standards taught are maintained.

An evaluation could consist of follow-up QA processing of trained personnel to examine lesson retention, observe work in progress, or visually verify the condition of stockpiles. Although it might seem unlikely that countries would permit QA assessments of their depots, it is not impossible. Already, inspections as part of agreements on weapons of mass destruction are carried out by government agencies such as the US DoD's Defense Threat Reduction Agency (DTRA, n.d.) and the UK MoD's Joint Arms Control Implementation Group (JACIG, n.d.). Therefore, treaties covering the inspection of much less controversial items should be possible and could improve standardization and the regional exchange of expertise among developing countries.

Conclusion

The negative impact that armed violence has on development has been internationally recognized in the Geneva Declaration, the Oslo Conference on Armed Violence, and the Millennium Development Goals. Although the degree to which PSSM affects poverty alleviation will vary from country to country and region to region, it is clear that the issue is no longer unrelated to other developmental activities. Similar to trends in SSR activities, there is a need for greater acknowledgement of the negative impact poor PSSM has in developing countries and possibly greater prioritization of it to ensure that it is 'done right'.

Whether or not stockpile management receives more attention from donors in the future, the key issues that will determine PSSM programme sustainability inevitably lie outside the sector. Governance and general managerial ability in the country receiving assistance and its military and police forces will be the ultimate factors that decide how successful and sustainable stockpile management projects are. Nonetheless, well-implemented projects can help influence these institutions.

At a time when aid budgets are being reduced, or in some cases cut all together, implementing agencies need to ensure that they present donors with maximum value for money. Many of the improvements relating to PSSM that have the biggest impact on safety and security can be achieved at relatively little cost and without the need for large-scale infrastructure-based projects. A well-trained technician—who is given access to a depot, armoury, or store—supported by a willing team from the agency concerned can oversee a tidy-up, create a basic weapons and ammunition register, inspect weapons and ammunition, and adapt global standards to local circumstances. This ‘bottom-up’ approach will greatly reduce some of the key risks associated with PSSM and begin to move the focus within the sector from workshops and conferences to action. 📌

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Courtesy of the German Federal Ministry of Defence and the BwVC.

Chapter 3: German Armed Forces' Experiences Gained in a Small Arms and Light Weapons/Conventional Arms Project in Cambodia

By German Federal Ministry of Defence/Bundeswehr
Verification Centre

Preliminary remarks

From 2007 to 2009 the Bundeswehr joined forces with Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ)¹⁷ to implement the Integrated Project on SALW Control and Improved Safe Storage of Ammunition and Explosives in Cambodia. This project sought to improve the storage safety and security of ammunition and small arms. Tasks assigned to the Bundeswehr were limited to the ammunition and explosives of the Cambodian armed forces—while other project partners were responsible for dealing with small arms held by the state, for example.

With this pilot project, both partners entered uncharted waters. Never before had the Bundeswehr and GTZ worked so closely together, and neither had previously carried out similarly comprehensive and complex small arms projects. Previous experience gained in similar projects was not available to draw upon. Thus, a major task was to effectively combine the capabilities offered by the two organizations in order to achieve the project's goals.

A wide variety of experiences were gained during the conduct of the project, as is typically the case. The experiences described in this report are from the perspective of the German Armed Forces. It is not the intention of the report to criticize, embarrass, or attribute blame to anyone involved in the project. Rather, its aim is to share the experiences in order to improve the quality of similar projects in the future.

Initiation and preparation

After several explosions in ammunition depots, the last one in the Cambodian province of Battambang on 31 March 2005, which killed six people and injured

20, the Cambodian government asked the international community for assistance to improve the safety and security of its storage depots (see Figure 3.1). A study conducted with EU assistance identified significant deficiencies in the storage and management of ammunition in Cambodia, as well as a need to destroy ammunition that is no longer suitable for storage. On this basis, the Cambodian government wrote to the German ambassador to Cambodia on 22 August 2006 and asked for comprehensive technical support for the safe stockpile management of small arms and ammunition, as well as for the planning and identification of the resources required to dispose of thousands of tons of surplus old and unsafe ammunition.

Cambodia—with the assistance of the EU and other donors—has made significant progress in the area of small arms control in recent years. However, the country is still burdened by the complex problem of large surpluses of old, contaminated, and unserviceable ammunition. It is estimated that at least 40,000 tons of old ammunition of various origins is stockpiled in Cambodia, and the major part of this ammunition is stored in dilapidated buildings scat-

Figure 3.1 **A pre-PSSM programme Cambodian stockpile**



Source: Courtesy of the German Federal Ministry of Defence and the BwVC

tered throughout the country. Most of the problems related to small arms and ammunition result from a lack of or insufficient infrastructure, organization, material supplies, and personnel expertise, all of which are required for the correct storage of ammunition in accordance with international standards.

Decreases in holdings routinely occur as a result of theft, corruption, and negligence. The sale of scrap metal from the ammunition can explain some of this, as it is potentially a source of income. However, incorrect disassembly of the ammunition to gain scrap metal often leads to fatal accidents. In addition, the continuous threat to people and the environment is significant, because the ammunition items corrode, are mechanically damaged, or otherwise become leaky so that explosives are released that contaminate the soil and ground water. Some components are carcinogenic or mutagenic or may cause embryonic abnormalities.

Furthermore, since the ammunition ages more rapidly under the poor storage conditions, the risks related to the technical condition of the ammunition increase rapidly, thus endangering the safety of both the people handling the ammunition and those living near the storage sites. Items of special concern in this context are, for instance, propellant charges—given the high ambient temperature and high humidity, the chemical stability of the propellant can deteriorate to such an extent that spontaneous ignition occurs. It is often not possible to determine by visual inspection of individual items how far the aging process has progressed. Furthermore, despite their age and condition, these explosives can still be used for improvised explosive devices in terrorist attacks, so that their hazard potential is not limited to a specific site. Thus, measures to improve the physical safety and destruction of ammunition simultaneously help to prevent terrorist attacks.

Preparation and planning phase

An initial assessment visit was conducted in Cambodia in December 2006 as a first response to the Cambodian request for assistance. GTZ contracted an ammunition specialist from the Netherlands as project manager. This specialist, together with two ammunition experts from the Bundeswehr Verification Centre (BwVC), conducted an assessment in order to determine on site whether a project of this kind was necessary and feasible. As in any project of this kind,

it was particularly important to establish a picture of the initial situation in the host country at an early stage.

According to the draft project plan developed by GTZ by late January 2007, the venture was to take the form of an 18-month pilot project, which initially covered only one of the six military districts in Cambodia. The basic principle of the project was to 'help them to help themselves'. While no preliminary commitments and promises had been made during the first assessment visit regarding the request for support, the initial expectations of the Cambodian project partners in terms of the content and scope of the German support were noticeably high. For example, actors at the middle management level in Cambodia often expected that the German partners in the project, i.e. GTZ and the Bundeswehr, would not only finance the project, but manage its entire planning, organization, and implementation. As a result, lengthy and difficult discussions were required on site to make the Cambodian project partners aware that some input was required from them as the result of the principle 'help them to help themselves'.

The German Federal Ministry of Defence had promised the Foreign Office and GTZ at an early stage that the Bundeswehr would make a substantial contribution to the project. In addition to conducting training activities, BwVC was to be involved in the renovation of ammunition storage hangars; the provision of certified containers for the decentralized storage of ammunition; and the examination, packing, rewarehousing, and destruction of ammunition. In the end, however, the Bundeswehr's contribution was reduced to basic ammunition technical training, training in stocktaking at ammunition depots, and the rewarehousing and destruction of ammunition.

The activities carried out between April and June 2007 mainly focused on the intensive collection of information by GTZ, mostly through Internet research and interviews with embassy personnel on site. Partly due to personnel changes that happened to occur at both the German embassy and the GTZ office in Phnom Penh, it proved rather difficult to comprehensively assess the Cambodian request or plan for the implementation of the project. Another limitation was the fact that Germany had no military attaché accredited to Cambodia. Hence, in the beginning there were no established connections and thus no way of solving problems at short notice. In addition, it was not possible to

make further evaluation and planning trips after the first assessment visit. Trips of this kind would have been useful means of providing the responsible personnel with a first-hand impression of the conditions on site.

Finally, GTZ concluded its project planning at the end of May, and according to the terms of reference for the project supplied to GTZ by the German Federal Foreign Office, the following project objectives were to be achieved between July 2007 and December 2008:

1. The capacity of the national committee to reform the management of small arms and ammunition should be improved.
2. The capacity of the Cambodian government and armed forces to store small arms and ammunition should be improved.
3. The ammunition and explosives of the 3rd Military District should be safely stored or destroyed.
4. The Cambodian government should be enabled to initiate discussions on small arms control within the ASEAN¹⁸ framework.

Alterations to the plan

These project objectives were finally approved by the German ministries involved and served as a guideline for all activities and any changes made to the project plan. It became clear in the course of the project that, while most of the project objectives were reached, the original implementation plan had to be adapted several times for a variety of reasons. In most cases, changes were needed because of delays caused by administrative and/or legal obstacles on both the Cambodian and German sides that made it impossible to stick to the original plan without having to postpone the entire project.

For example, it was indispensable in the German view to conclude an MoU between Germany and Cambodia prior to implementation that set out all the activities and framework conditions of the project and defined the legal status of the German soldiers employed in the project. This applied in particular to Cambodian legal requirements in effect since 2005 that expressly prohibited foreigners from handling weapons, ammunition, and explosives. The role planned for Bundeswehr soldiers, however, required them to do this. Thus the Bundeswehr and GTZ deemed it necessary to conclude a relevant MoU prior to the

start of such activities. The MoU, however, was not concluded until the end of February 2008, several months after programme activities commenced, forcing significant changes to be made to the original implementation schedule.

Considerable subsequent adaptations of the project plan also became necessary due to extensive German regulations governing the conduct of German soldiers stationed abroad. The effects of this on the implementation of the project had been underestimated initially.

It was the system of allocating funding to the project, however, that had the greatest impact on the planning process. German regulations stipulated that budgetary resources were allocated only for a specified fiscal year, which meant that all funds provided for a fiscal year must be accounted for by the end of that year at the latest (the German fiscal year ends in February). As a result, it became necessary to make radical changes to the original project plan. To expedite the process, the decision was made to first accomplish those tasks that did not absolutely require an MoU. Project elements scheduled for 2008 not requiring a lengthy agreement were identified and moved up so that the authorized funding—which would otherwise have expired—could be rescheduled for 2007. The earmarked funds for the Bundeswehr elements were particularly affected. As a result, the initial plans had to undergo significant changes even before the actual start of the project.

The lack of information and basic data on the ammunition present in Cambodia was another challenge for the planning and execution of the project. Dealing with the technical problems posed by inappropriately stored ammunition in Cambodia was a new task for the German specialists, and so little experience and few directives and records were available to guide them. The available ammunition studies from Balkan countries were useful only to a limited extent, since the infrastructural, climatic, and other conditions there were completely different. Only the documentation on the EU project, terminated in 2006, to improve small arms stockpile security in Cambodia contained some useful findings on the special conditions in that country.

The level of corruption that is typical of the country was also widely underestimated at first. Even though the overall effects of corruption on the conduct of the project were not dramatic, the measures aimed at preventing it required proper planning.

Due to the numerous peculiarities of the project, substantial changes to the outlined concept had to be made time and again to adapt it to the circumstances that arose. Such far-reaching and dynamic changes required that all stakeholders should properly understand and accept the resulting changes to the original plan, which were sometimes considerable.

Planning: time frame and phasing

Due to the previously mentioned German fiscal rules, multi-year projects must apply for budget allocations every year. This leads to a form of uncertainty that can impact planning. With this in mind, detailed plans for the PSSM programme were drawn up for the period August 2007–February 2008, i.e. for the 2007/8 financial year under way at the time. Given the need for continuity in a multi-year project, however, less detailed plans for the second programme year's activities, scheduled for March 2008–February 2009, were drawn up simultaneously. The planning phase was initially based on the final project plan submitted by GTZ at the end of May 2007.

Given the budgetary restraints, the start of ammunition expert training was moved up to September 2007. Training was scheduled to last approximately 40 days and was to be concluded before the 2007 Christmas holidays, taking the long Cambodian holiday period from the end of October until mid-November into account.

At the same time, the inspection and evaluation of ammunition was also to take place before the end of 2007 as part of the training. This ensured that some of the evaluated ammunition items would be properly stored in renovated ammunition storage facilities or certified ammunition containers by the end of 2007. As a consequence, part of the training curriculum had to be changed once again in order to accommodate training in the inspection, transportation, and storage of ammunition items. Later, this plan had to be changed yet again because, among other reasons, the infrastructural requirements scheduled to be fulfilled by other stakeholders were not met in due time. This is a good example of the need to coordinate activities among the individual elements of a project.

In the joint BwVC–GTZ project plan, BwVC agreed to take responsibility for all training measures and consultations dealing with ammunition-related issues.

The Bundeswehr's activities were mainly focused on the training of selected Cambodian armed forces personnel in all areas of stockpile management, ammunition inspection and evaluation, and destruction of unsafe ammunition by OBOD techniques. In addition, support was to be provided to improve the conditions for storing operational ammunition and ammunition earmarked for destruction.

BwVC had been made responsible for the coordination of the practical implementation of the Bundeswehr contribution to the project. The mission in Cambodia was planned as follows:

- **Phase I, 26 September–26 October 2007:** Basic ammunition technical training (20 training days); concurrently, ammunition technical and medical reconnaissance.
- **Phase II, 14 November–21 December 2007:** Ammunition inspection training, including rewarehousing of ammunition (25 training days).
- **Phase III, 8 January–22 February 2008:** Training using ammunition in service with the Cambodian armed forces, and training in associated destruction procedures (30 training days); concurrently, ammunition technical and medical preparation for Phase IV.
- **Phase IV, March–April 2008:** Training in the destruction of surplus, damaged, or contaminated ammunition (approximately 20 training days).

Because the MoU had not yet been concluded, Phase IV had to be postponed even further until October–December 2008.

Personnel and equipment

As has been explained, the Bundeswehr's participation in this project was a completely new task for the troops assigned to the project. It did not fit either into the established system of Bundeswehr missions abroad under the Bundeswehr Operations Command and other bilateral Bundeswehr projects or into the format of classic arms control missions. Thus, an appropriate project organization as well as administrative and pension-related framework conditions had to be established for the German personnel employed in the project. The arrangements had to take the local, temporal, and climatic conditions of the mission and the hazard level resulting from the handling of problematic ammunition into account.

Moreover, it had to be determined whether explosives, detonators, and igniters required for the demolition training would have to be imported from Germany, or whether appropriate material was available in Cambodia. To this end, enquiries on the Cambodian market had to be made and the available material had to be examined as regards its safety features. It became evident only much later that this aspect had a far-reaching impact on project planning.

However, it became obvious early on that, in spite of the extensive regulations, the success of the project would depend on the decisions made on the spot at the deployed personnel's discretion. For this reason, the selection of the German mission personnel was of the utmost importance for the viability of the project.

Conducting the project

Initial stages: basic ammunition technical training

During the first phase beginning at the end of September 2007, the first 38 Cambodian soldiers received basic ammunition technical training. The training took place on the premises of the Cambodian Mine Action Centre (CMAC) at Kampong Chhnang based on the relevant contract concluded by GTZ and the CMAC. A total of 140 training hours were taught. Approximately 75 per cent of the training was theoretical and 25 per cent practical.

A broad range of issues were covered, from safety provisions for the handling of ammunition to international ammunition storage standards, ammunition technical principles, effects of ammunition and explosives, health and safety provisions, hazard classes and compatibility groups, exposed sites, infrastructural and organizational safety measures and action to be taken in case of an accident, the organization and management of stockpiles, and the transport of ammunition. Practical training focused on working with checklists, assessing ammunition storage facilities, and correctly identifying ammunition (see Figure 3.2).

Considerable organizational challenges arose during the first training phase. Hardly any of the Cambodian soldiers chosen for the training spoke English, so all training activities had to be translated from English into Khmer. Moreover, all training documents needed for Phase I were also prepared in English, requiring the GTZ project manager to have them translated early on into Khmer.

Figure 3.2 **Technical training in ammunition management**



Source: Courtesy of the German Federal Ministry of Defence and the BwVC

When training began, however, only a small part of the training documents had been translated into the local language. Great efforts were required to provide the trainees with training handouts in time so that they could take notes during the lessons. However, these handouts were not available at the start of the training and had to be translated on site, which made the initial stages of the training activities much more difficult. The linguistic problems clearly made the training less smooth and expeditious, but they were reduced more and more in the course of the project and did not have any noticeable impact on the safety situation.

The practical training was also hampered by considerable difficulties at first, because some required training material was not available, e.g. ammunition boxes to store loose items, which had to be made by local carpenters. Also, delays were experienced in what proved to be the difficult process of acquiring inert ammunition for training, which could only be obtained with the help of CMAC.

In addition, German personnel were challenged, particularly early on, by the different climatic conditions, hygiene standards, and culinary customs

that characterized life in Cambodia. This was particularly acute during the initial phases of the project when instructors frequently suffered from gastrointestinal problems.

Medical reconnaissance

At the same time as this basic training was taking place, a medical reconnaissance was carried out. This focused on determining if it would be possible to establish a medical evacuation chain in accordance with German standards if the medical facilities, qualified personnel, and transport capacities available in Cambodia were used. According to German directives, patients with life-threatening disruptions of their vital functions must be given continuous medical care from the accident site to the final treatment in a hospital, based on a predefined set of tasks. The guiding principle in this context is to ensure medical care that corresponds to German standards, particularly in the case of the polytraumatic injuries that are typical of ammunition accidents. This requirement presented a special organizational challenge. Soon it became clear that it would not be possible to establish the required medical evacuation chain in a cost-effective manner without the provision of basic medical care as part of host nation support and without using the medical facilities, qualified personnel, and transport capacities available in Cambodia. Thus, further detailed information on possible host nation support was requested from the Cambodian side; this information, however, was provided only to a limited extent. Most of the information submitted before the on-site reconnaissance later turned out to be wrong. Therefore, the decision to check on site whether and how the medical evacuation chain could be established had been correct.

The initial assessment of those medical facilities that had been suggested by official sources showed that, for many reasons, it would not be possible to establish a medical evacuation chain that met German standards. However, in the course of the reconnaissance process, other options were identified, based mainly on use of the newly opened Royal Angkor International Hospital at Siem Reap and helicopter evacuation facilities provided by the company Helicopters Cambodia. Role 1-level care could be achieved by having a German mobile emergency physician team equipped with appropriate medical personnel and material on call close to the training site.¹⁹ To meet the requirements, it would

be necessary to ship an ambulance and medical supplies by sea and send German blood bottles to Cambodia. All other elements of a medical evacuation chain required by German medical standards could be established in a cost-effective way with a sufficient degree of security and reliability by using facilities and means of transport available in Cambodia. With this assessment, an important obstacle to preparations for demolition training was removed.

Demolition training

In order to conduct the demolition training scheduled for a later stage in the project, a suitable demolition area had to be found. The relevant reconnaissance took place in parallel with the basic training activities. A suitable area, which was usable with a few limitations, was situated approximately 12 km from the CMAC premises at Kampong Chnnang in hilly, forested territory. The access road to the area was suitable for an ambulance, and it was possible for a rescue helicopter to land. The location featured a demolition site approximately 15 m in diameter and several smaller demolition pits at a distance of some 35 m, so that a maximum number of three demolition teams could be trained simultaneously. The hazard zone, however, covered only a distance of no more than 800 m. The available shelter within the hazard zone, some 300 m from the demolition site, did not comply with German safety standards, so improvements were necessary. Still, in general, this demolition area was suitable for the intended training, thus removing a second obstacle.

The basic training for the first 38 Cambodian soldiers was successfully concluded at the end of January 2008, even if some deficiencies remained.

The second round of training

From March to the end of June 2008 the same basic training was successfully repeated for another 35 Cambodian soldiers. This time, there were significantly fewer organizational problems.

Ammunition stocktaking and preparations for ammunition storage and destruction

At the same time (March–June 2008), a second round of training for the original 38 Cambodian soldiers was taking place, this time covering the inspection

Figure 3.3 **Ammunition stocktaking**



Source: Courtesy of the German Federal Ministry of Defence and the BwVC

of ammunition and stocktaking in preparation for ammunition storage and destruction (see Figure 3.3). Again, new ground was broken in a field where there had been only very little previous conceptual preparation. This training was designed as a road map for preparing a disposal concept.

First of all, a comprehensive stocktaking and technical assessment of the condition of the ammunition had to be performed. In this context, it was necessary to train the Cambodians how to establish the immediate, short-, medium-, and long-term needs for action required to improve stockpile conditions and destroy unserviceable ammunition. After an ammunition situation picture had been established, they were taught how to analyse potential disposal techniques and concepts. Numerous factors had to be considered in this analysis, like the overall holdings of ammunition broken down into calibres, types, explosives weight, and explosives types; the ammunition's condition; the location of the storage facilities; possibilities for interim storage; the availability of suitable explosive demolition sites; applicable environmental protection provisions;

options for recycling; and technical and infrastructural requirements such as the provision of electrical power and water, and the state of the roads.

The next step was to identify the surplus stockpiles to be destroyed; to determine the personnel, funding, infrastructure, and other resources that were needed; and to prepare a comprehensive schedule for all rewarehousing, transport, destruction, and disposal activities.

The training in ammunition destruction and stocktaking turned out to be much more complex and difficult than expected. It required steps both to evaluate and improve the results of the previous training phases and to create a situation picture of the technical condition of the ammunition. Each day, a new situational assessment was required.

During the training activities, the safety of the ammunition in terms of handling and transport was verified by visual inspection. In this context, simple measures were taken to render the ammunition safe if other options to prevent immediate danger, to re-establish handling and transport safety, or to improve storage safety were not possible or were deemed insufficient or inappropriate. Due to restrictive German safety provisions, ammunition items were not disassembled—i.e. no components were removed from each item—nor were shock tests conducted (a low-order procedure), although this would often have been the most appropriate solution. In general, those activities requiring that priority be given to carefulness and caution over any other considerations had to remain below a hazard risk threshold that would have required the presence of a medical evacuation chain, because such an evacuation chain had not been established at that time.

The aim of the practical training of the Cambodian soldiers was to improve the state of the ammunition storage facilities—as far as this was possible, given the local conditions—and place them on the path towards compliance with international standards and German regulations on the interim storage of ammunition and its destruction. Among others, this meant that compatibility group B and F ammunition had to be stored separately from ammunition from other compatibility groups, if this were possible under the conditions on site.²⁰ The fuses were removed from the ammunition, if this was possible without disassembling it completely (e.g. PG 2 rocket-propelled grenades), so that the ammunition could be reclassified into a compatibility group that required

greater storage safety; moreover, the amount of ammunition of compatibility group F was thus reduced and the number of ammunition items to be stored separately was decreased.

If no suitable packaging was available, the ammunition items were stacked in a manner that prevented their sliding out of place. The stack height was adapted to the type and condition of the ammunition items, taking into consideration the often limited space available. The placing of the ammunition items into interim storage was accompanied by stocktaking. Recovered and damaged ammunition that posed a particular danger and had to be destroyed as a matter of priority was specially marked and stored separately if local conditions permitted. The inventory list developed within the scope of the project proved to be very useful in practice, and the Cambodian trainees had no difficulties in using it.

In view of the very different but always unpredictable ways in which the situation at the various ammunition storage sites developed, it was a repeated challenge to identify both the major activities that would be carried out by the German personnel and the binding restrictions imposed by health and safety provisions that limited these activities. Since the relevant provisions had to be extrapolated from numerous regulations and directives, the preparation of a detailed training and work plan for each day was always an essential task.

As we have seen, the aim of this part of the project was to improve the capacities and skills of the Cambodian armed forces in the area of ammunition and explosives storage to such an extent that they could assume full responsibility for the control of ammunition and explosives in conformity with international standards on safe and secure stockpiling. As a consequence, the Cambodian soldiers had to be trained to perform the activities described above by themselves. For this reason, the methodical approach that is routinely applied in the Bundeswehr, i.e. ‘demonstrating – explaining – imitating – practising’, was selected and proved its worth in this context.

In addition, German regulations stipulated that hazards must be reduced where possible, and immediate steps had to be taken to prevent them from arising where necessary. These regulations were equally applicable in Cambodia, requiring appropriate measures be taken to comply with them as part of the training course. Given the state of the local storage facilities, the entire Cambodian

ammunition stockpile was categorized as damaged ammunition or—a similar category—ammunition that had been exposed to extraordinary stress. As a result, any handling of the ammunition was permitted only if it had been examined and cleared by a German ammunition expert.

The documents that had been prepared in advance based on research proved their worth as useful references, but they had to be expanded to include much more detailed information. In spite of the additional time required for the initial stages of training, the selected approach, i.e. to comprehensively instruct the Cambodian trainees and train them to take the entire inventory themselves and classify the ammunition into the various categories according to its condition, as well as to have them prepare the inventory report in Khmer, was the right one.

Ammunition destruction

The practical training of personnel in the destruction of live ammunition was the highlight of the Bundeswehr mission. Long-term planning and comprehensive preparations started as early as the spring of 2007, when applications were submitted for the planning of a medical mission concept and the delivery of German igniters and detonators to Cambodia, as well as for an exemption permit for the use of explosives not in service with the Bundeswehr. Nonetheless, despite these careful preparations and the employment of an advance party, it was not clear until a very advanced stage of the project whether training in ammunition destruction would actually take place. Due to the limitations stipulated in the German ammunition technical regulations, numerous exemption permits had to be obtained from Germany to allow the ammunition destruction training to take place.

A short-term decision was made not to use the initially designated CMAC demolition area at Kampong Chnnang, because the integration of a helicopter into the medical evacuation chain was deemed too risky. Two demolition areas located close to Royal Angkor International Hospital, which was suitable to serve as a role 2 facility,²¹ had been identified as a possible substitute as early as April 2008. In June 2008, however, it became evident that the larger of the two demolition areas, which would have provided a hazard area of 1,000 m in diameter, could not be used, since the area had already been converted

to another use. The smaller demolition area initially provided a hazard area of only 500 m; this would have limited the calibre of the ammunition that could be destroyed to just 75 mm according to German regulations. The arrangements made in Cambodia for the preparation of the designated demolition area were summarized in a comprehensive user requirement, the personnel and material support needed during the training was specified, and at the same time an application was submitted to the responsible German authority requesting authorization to employ passive protection measures in order to reduce the diameter of the hazard area. The local CMAC unit prepared the demolition area appropriately on time so that it complied with German health and safety provisions, finally providing a hazard area of 750 m in diameter, allowing for the detonation of calibres up to 110 mm. The training would not have been possible if it had not been for the comprehensive support provided by CMAC.

The material required for the medical evacuation chain was shipped according to plan, but the Cambodian customs authorities delayed its release for about two weeks; it was released only after urgent appeals to local decision makers. The German blood bottles had to be brought to Cambodia as air freight, an uninterrupted cooling chain had to be maintained, and the overall transport duration had to be no more than 96 hours.

According to the technical datasheets, the electric detonators available in Cambodia were Class I detonators and not the Class II or Class IV type that were required in the exemption permit; however, the detonators in service with the Bundeswehr were classified in shipping category 1.1 B and could thus not be transported by air, while sea transport would have taken too long and cost too much. Hence, to be able to conduct the training, it was necessary to import commercial electric Class II detonators procured from German industry. Due to the significant air transport restrictions resulting from their classification in shipping category 1.4 S, these detonators became available in Cambodia later than originally planned.

After a three-day refresher course in which 23 Cambodian soldiers were also trained for the first time in the non-electric initiation method, the practical explosive demolition training commenced as planned with instructional demolition and live demolition familiarization training. Once the electric detonators had arrived, the training switched to the electric initiation method. As a result of lengthy negotiations with the relevant German authorities, the number of types

of ammunition that could be used for demolition training was slightly increased, but the ammunition used was still limited in extent and variety.

The climatic conditions at the demolition area were extreme and particularly challenging to the physical abilities of the employed personnel. With no shade and no wind at all, temperatures reached 45 degrees Celsius at the demolition pits and 35 degrees Celsius under the weather shelter used for personnel on call. Due to these extreme weather conditions, it was necessary to replace the officer in charge, the safety officer, and the instructors at the demolition pit repeatedly during each day of demolition activities. This fact has to be taken into consideration in personnel planning.

Lessons learned

1. An early and comprehensive reconnaissance is of the utmost importance for the success of a project of this kind. Decisions should be made only when the key factors have been identified and assessed.
2. A comprehensive reconnaissance includes efforts to determine the initial state of the site. The essential technical factors affecting the site have to be established and the legal framework of the country receiving assistance has to be analysed so that project activities can be planned in light of the fullest possible knowledge of the circumstances that the programme will have to deal with.
3. In this context, detailed knowledge of the general legal conditions pertaining to such a project and how they will affect implementation is indispensable. During the project described above, the actual impact of several essential Cambodian and German legal requirements was recognized only at a later stage. As a result, the conduct of the project was delayed or hampered.
4. Concrete planning should start only when sufficient information is available and has been verified. The principle of prioritizing thoroughness over speed should apply. Moreover, the assisting entity must consider alternative ways of providing support that may be very different from the kind initially requested, in some cases resulting even in a refusal of the request for support.

5. By the end of the preparation phase, comprehensive and valid information should be available about the following factors:
 - the country and its people; climatic conditions; the infrastructural situation in the country; local conditions; routine daily activities; means of communication; logistics; power supply; potable water supply; food supplies; the availability of training materials, office supplies, and maps, etc.;
 - the general framework conditions for the work, such as previous, ongoing, and planned projects of a similar kind and the lessons learned from these projects; training facilities/installations/material that could be used; infrastructure in the storage facilities; demolition sites; interpreters with knowledge of ammunition; expert ammunition skills available in the country; mobility ensured by the provision of vehicles; traffic infrastructure; etc.;
 - necessary measures to improve the assistor's own security; medical care actually available on site; mine risks; direct points of contact with potential project managers at the Ministry of Defence and the Ministry of Internal Affairs for emergencies; the availability of local emergency services; etc.;
 - relevant legal provisions, e.g. regarding the use, import, and export of the assistor's explosives and pharmaceuticals;
 - the possibility of using existing structures like non-governmental organizations working in the country; and
 - other factors like the trainees' commitment and willingness to perform, and the objectives and potential of the military structures relevant to the project.

6. The decision for or against a project should be made only when sufficient knowledge about the actual local situation and the resulting need for action has been gained. The limits of the assistor's own capacities should be taken into account as well. Those deciding whether to undertake a project must clearly identify to what extent and under which conditions the request for support will be granted. The relevant information should be set out in writing together with the partner to be supported. In this context, any commitments made so far that are essential for the project must be

- taken into consideration. Furthermore, the project objectives and the financial, personnel, and material/technical contributions of the various participants in the project and the maximum duration of the project should be determined. Moreover, benchmarks need to be identified and criteria for either continuation or termination should be agreed upon from the start.
7. Before the start of the project, its organizational structure has to be established, the personnel who will execute it have to be assigned, and the necessary administrative and pension-related arrangements have to be made. The arrangements also have to take the local, temporal, and climatic conditions that the mission will encounter into account, as well as the hazard level resulting from the handling of problematic ammunition.
 8. In order to be able to react to possible developments occurring at short notice, and to their long-term consequences, planning must be flexible. Personnel and material resources must be held in reserve, and sufficient additional time must be included in the schedule of activities to allow for possible delays and setbacks.
 9. The concept of 'rolling planning'²² with the simultaneous identification and early prioritization of fields of activities has stood the test of time. Each stage of the work must be analysed in detail so that critical elements—like the timely availability of exemption permits for the electric detonators—are recognized at a very early stage in the overall planning. It is vital to determine a 'critical path' when planning the various stages of the work. This means that those points in the sequence of work stages where bottlenecks may be expected— e.g. the transport by sea of medical supplies or the delivery of blood bottles by air according to strictly defined transport provisions—must be identified and special attention has to be paid to these potential bottlenecks when carrying out project activities.
 10. The budget for the project must take into account that changes in the planning of personnel and material resources automatically result in changes in budgeting. For example, the use of external reinforcement personnel who remain only a few weeks in Cambodia will lead to a significant increase in flight costs.
 11. When planning personnel resources, the special climatic conditions, the likelihood of increased absences due to illness, and technical and organ-

izational problems have to be taken into account. Particularly in the first phase of activities in the country, a higher rate of illness among the instructors is to be expected, until their bodies have adjusted to the different hygiene standards and culinary customs.

12. No special importance was attached to one factor right from the start, which proved to be a mistake in retrospect: that of project marketing within the German Armed Forces. Early project marketing and the creation of a positive environment for the project are indispensable preconditions for promoting its success and ensuring strategic support for it. In addition to providing cover for the decision makers involved, the major aim of project marketing is to secure funds and personnel resources for both the execution of the planned/ongoing project and possible follow-up projects. In this respect, the German Armed Forces could have learned a great deal from GTZ's excellent project marketing.

Conclusion of the project

The project in Cambodia was concluded on 31 December 2009. Up to the summer of 2009 the Bundeswehr withdrew gradually from the project by successively reducing its personnel. While the original, very ambitious project objectives were not fully achieved, substantial progress was made in the control of conventional ammunition in Cambodia, even though the resources provided for the project were quite limited. The basic technical and logistical knowledge needed for the handling of ammunition was conveyed, and operations commenced to rewarehouse still serviceable ammunition into buildings suited to and prepared for the storage of ammunition, but there were some indications that further advice, supervision, or even further training might become necessary. Time will show if the remarkable achievements of the project are sustainable. 📄

Endnotes

- 1 Author interview with Anton Martyniuk, OSCE, 17 December 2010.
- 2 Author interview with Anton Martyniuk, OCSE, 11 February 2011.
- 3 Author interview with Anton Martyniuk, OSCE, 11 February 2010.
- 4 Author interview with Jack Bell, OSCE, 26 October 2010.
- 5 Author interview with Anton Martyniuk, OSCE, 17 December 2010.
- 6 Author interview with Steve Costner, US Department of State, Bureau of Political-Military Affairs, Office of Weapons Removal and Abatement, 18 February 2011.
- 7 Author interview with Jack Bell, OSCE, 26 October 2010.
- 8 Email from Anton Martyniuk, OSCE, 14 December 2010.
- 9 Author interview with Anton Martyniuk, OSCE, 17 December 2010.
- 10 Author interview with Anton Martyniuk, OSCE, 17 December 2010.
- 11 Correspondence with David Towndrow, NATO, 26 October 2010.
- 12 Correspondence with David Towndrow, NATO, 26 October 2010.
- 13 Jasna Lazarevic, interview with manager of a demilitarization firm in South-east Europe, 8 November 2010.
- 14 Notices filed with aviation authorities to warn pilots of hazards along their route, e.g. air shows, rocket launches, military exercises, closed runways, high-rise cranes, etc.
- 15 Email exchange with Anton Martyniuk, OSCE, 7 February 2011.
- 16 Email exchange with Anton Martyniuk, OSCE, 7 February 2011.
- 17 From 1 January 2011 known as the Deutsche Gesellschaft für Internationale Zusammenarbeit, or GIZ, after a merger with other organizations.
- 18 Association of South-east Asian Nations.
- 19 A role 1 medical treatment facility provides first aid, triage, resuscitation, and stabilization. It is an essential element of every German national contingent and it must be readily available to all military personnel.
- 20 Compatibility group B and F items must be stored separately from articles from other compatibility groups in such a way as to prevent their propagation. Group B consists of detonators and similar initiating devices not containing two or more independent safety features. Examples include detonators, blasting caps, small arms primers, and fuses. Group F consists of ammunition containing high explosives with their own means of initiation and with or without propelling charge. Examples are grenades, sounding devices, and similar items having an inline explosive train in the initiator.

- 21 A role 2 medical facility is an intermediate facility capable of receiving casualties, providing triage and stabilization for further evacuation, and treating and holding patients until they can be returned to duty or evacuated.
- 22 'Rolling planning' means a phase-oriented form of planning. An already established plan is updated, substantiated, and reviewed at regular intervals. The level of detail of activities planned for the near future is much greater than that for later phases.

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