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The Production of Ammunition for Small Arms and Light Weapons

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Introduction

The availability of ammunition for the small arms and light weapons used by armed groups and criminals is a crucial determinant of the ability of these actors to use lethal force. The control of the production of such ammunition can have an important impact on this availability. This chapter clarifies key aspects of the production of ammunition for small arms and light weapons and the roles of those involved.¹ It examines global ammunition production, including industrial and craft production, the number of producers and production volumes, and the production of high-quality ammunition. This chapter also provides an overview of structures and trends in the industry for small arms ammunition, guided light weapons ammunition, and relevant production technology and equipment. A last section looks at the scope for controls, particularly on transfers of production capacities and ammunition components; because of risks of diversion, tight control of ammunition production is an important element in combating illicit trade. The conclusion argues that states should apply responsible standards in authorizing transfers of production capacities and ammunition components in order to limit the proliferation of illicit ammunition.

An overview of global ammunition production

Ammunition commonly in use today, with the exception of guided ammunition for light weapons, does not differ significantly in its basic design or production

techniques from the ammunition that was used 100 years ago (see Chapter 1). The production of unguided small arms and light weapons ammunition need not require a sophisticated technology infrastructure. Many of the machines used in the production process, such as those for the production of cartridge cases and bullets, are similar to those used in other types of metal processing activities.² This low technological entry-barrier for small arms ammunition production has contributed to the widespread establishment of ammunition manufacturing capacities around the world (UNGA, 1999, p. 6, paras. 22–23).

As an illustration, research suggests that there are currently some 76 states that produce small arms ammunition for pistols, revolvers, rifles, carbines, sub-machine guns, and light- and heavy-machine guns (Small Arms Survey, 2005, p. 13). These producing states are principally located in Europe and the Commonwealth of Independent States (36 per cent); North and Central America (34 per cent); and Asia and the Pacific (13 per cent) (Small Arms Survey, 2005, p. 14). The fact that there can be significant differences in the quantity and quality of the output of ammunition production facilities, however, should not be overlooked.

Industrial production of ammunition

Global production of ammunition is dominated by industrialized mass manufacturing (UNGA, 1999, p. 6, para. 18). For small arms ammunition (defined as ammunition with a calibre smaller than 12.7 mm) industrial machinery will manufacture the empty cartridge cases, the bullets, the primers, and the propellant or explosive. In addition there are machines for heat- and surface-treatment of the relevant components as well as loading machines and assembly lines that bring together the individual ammunition components.³ Modern production processes are based on automated production lines that may consist of 15 or more interlinked machines (Mast Technology, 2006a). Modern manufacturers operate fully automated and computer-controlled production lines ‘with raw material flowing in at one end and fully assembled ammunition emerging at the other’ (UNGA, 1999, p. 5, para. 17).

At the same time, there can be important differences between industrial production facilities. At one end of the spectrum there are modern manufacturers (mostly in the United States and Europe) competing in markets for high-quality ammunition for sale to state actors in NATO member states. In order to compete

in international markets, a prime concern for modern manufacturers is the cost-efficient production of the high-quality ammunition ordered by these state actors.⁴ At the other end of the spectrum are small-scale, state-owned production facilities that are exclusively operated to meet, at least partially, the domestic demand of state actors. In many developing countries these facilities are not necessarily profit-oriented or profitable enterprises. They may rely on outdated machinery and remain idle between orders for ammunition from domestic actors.⁵ An example of such a facility is the Mzinga Corporation in Tanzania (see below).

In addition, there can be important differences between the range of products that are manufactured and processed at industrial facilities. Some production facilities may both produce and assemble the components required to produce a fully assembled ammunition round. Such facilities need only purchase the raw materials required to produce the components. In contrast, assembly facilities must buy completed components from other companies. It is frequent practice in the ammunition industry for a producer to subcontract the manufacture of cartridge cases and other components to another production facility. This may be done when, for example, acquiring completed components for use in later assembly is cheaper for the facility than producing them in-house.⁶

The number of industrial producers

It is difficult to determine how many ammunition production and assembly facilities currently exist around the world. Not all states publish information on the number and production capacities of their domestic ammunition facilities (UNGA, 1999, p. 6, para. 22). Secrecy by some states, including China, about their domestic production capacities is based on a perceived strategic need to prevent potentially hostile states from calculating the amount of ammunition available to national armed forces in the case of an armed conflict.⁷ The number of ammunition facilities is also difficult to quantify because of the high level of diversity between production facilities for components and facilities for assembly, as well as a lack of differentiation in public sources between small-scale producers and large conglomerates with many production facilities (UNGA, 1999, p. 6, para. 22). There are also frequent changes in the number of ammunition companies that are active in production at any given time because of consolidations and closures (UNGA, 1999, p. 6, para. 23).

It is not always possible to make an accurate distinction between producers of ammunition for military forces, law enforcement agencies, and other state actors, on the one hand (state actor markets), and producers of ammunition for private security forces and civilians for sport shooting, hunting, and personal defence, on the other (non-state actor markets). This is because many modern ammunition facilities have the capacity to produce ammunition for both markets.⁸ Certain calibres of small arms ammunition can also be used in arms employed both by military and police forces, and by sport shooters and hunters. For example, 9 mm ammunition for pistols is used by both state and non-state actors.⁹

Furthermore, there are certain types of ammunition that, although produced for different purposes, have the same dimensions, that is, the same calibre and length. These types may be used in both 'military' and 'civilian' small arms, albeit not necessarily at optimum levels of performance for the given military or civilian purpose.¹⁰ An example here is 7.62 x 51 mm ammunition for assault rifles used by armed forces in NATO member states. The dimensions, although not the propellant load and bullet characteristics, are the same as the .308 Winchester ammunition sold on civilian markets for use in game hunting rifles

A bullet is manufactured in Dara, Pakistan, near the border with Afghanistan, March 2006.
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(McKee and Kuleck, 2006). In the same way, 5.56 x 45 mm NATO ammunition for assault rifles used by armed forces has the same dimensions as .223 Remington ammunition for hunting purposes.¹¹

Available research does provide information about the relative distribution of different types of companies in the ammunition producing industry. For example, an investigation in 1998 into the US small arms ammunition industry revealed that while only a few companies are involved in the production of primers and propellants, many more produce cartridge cases and bullets (Stohl, 1998a, p. 9). Research further indicates that there are more companies producing small arms ammunition than companies producing ammunition for light weapons and, in particular, sophisticated guided missiles. Of particular interest is the fact that only a limited number of companies specialize in the transfer of modern production capacities for the mass production of high-quality ammunition components and fully assembled ammunition rounds.

Production volumes of small arms ammunition

In the light of the difficulty in determining the number of ammunition facilities, it is not surprising that there is no reliable information about the global annual volume of ammunition production. Moreover, it is usually not even possible reliably to determine the potential or actual ammunition output of a particular company—unless this information is made public by the company. The production capacity of a small arms ammunition production line is typically calculated in the industry on the basis of the maximum output of the assembly line. For a typical assembly line available from providers of such equipment, this figure amounts to 120–130 rounds per minute.¹² The potential annual output of such a line is calculated in the industry to be in the region of 7–12 million rounds (Mast Technology, 2006a).

These figures do not necessarily give a clear determination of the actual annual output of a particular production facility. Actual output by the facility will depend on a variety of factors, including the levels of training and efficiency of the engineers operating the machines, the maintenance of the production plant, the availability of required raw materials or ammunition components, and the output aims of the facility.¹³ To illustrate, one Belgian provider of an assembly line for 7.62 mm ammunition indicated that the line allows its clients in Europe to

produce 120 rounds per minute for 1,750 hours annually with the machines operating at 75 per cent capacity. This allows these clients to attain an actual annual output of 9 million rounds.¹⁴ The provider, however, voiced strong doubts that a potential client in a particular country in sub-Saharan Africa, who had recently sought to acquire such a line, would, in the light of the technical expertise of this client, have the capacity to achieve a similar output. The provider estimated that an output no greater than 6.3 million rounds per year was more realistic in this case.¹⁵

Apart from the factors outlined above, production volumes can differ significantly between individual facilities because of the number of production lines that are operated in the facilities. Specifically, while small-scale producers may have and operate only a single production line, large-scale producers may operate several production lines simultaneously. For example, a facility operating eight standard assembly lines for small arms ammunition in parallel may produce up to 1.5 million rounds each day (UNGA, 1999, para. 20). The parallel operation of lines allows large-scale producers annually to produce tens of millions of rounds and more of small arms ammunition.¹⁶ Indeed, the US Lake City Army Ammunition Plant, driven by the increased demand from the US Department of Defense in the light of the military operations in Afghanistan and Iraq, achieved an output in 2004 of 1.2 billion rounds of small arms ammunition (Alliant TechSystems, 2006).

In other words, even if the total number of small arms producing facilities was known, this would not necessarily allow for reliable information on global annual production volumes because of the lack of transparency by many companies and countries about their potential and actual annual ammunition output. This observation notwithstanding, there are estimates that global production in 2005 of small arms ammunition produced for military forces amounted to about 13 billion rounds (Forecast International, 2005).¹⁷

Production of high-quality ammunition

It is also important to clarify the different levels of quality of small arms ammunition. Specifically, high-quality small arms ammunition is understood by Western ammunition producers to be ammunition that is produced and performs according to NATO design and safety standards.¹⁸ These standards stipulate the exact

measurements and propellant loads of ammunition to ensure optimal performance and safety when used by the military forces of NATO member states. Manufacturers producing ammunition that fulfils the requirements of the NATO standards can mark their ammunition on the cartridge case with a cross within a circle to indicate that this ammunition meets the NATO standards.¹⁹

Western manufacturers argue that the mass production of such ammunition requires modern production technology and equipment that is available only from Western sources.²⁰ This is, of course, not to say that reliable and safe ammunition cannot be mass-produced with technology and equipment from non-Western sources. Nonetheless, Western manufacturers indicate that, in their experience, each round derived from such production would not necessarily fulfil the strict design and safety standards required of ammunition used by NATO member state armed forces.²¹

Craft production of ammunition

Alongside industrial production there is also small-scale craft production of ammunition. It is possible to assemble small-calibre ammunition at home with simple tools and materials that are easily available in some countries, such as the United States, where 'hand-loading' is a widespread practice of civilian gun owners.²² Hand-loading involves the assembly by hand of rounds for sporting and hunting purposes by (re-)filling empty cartridge cases (with primer and propellant) and by fitting either a newly purchased or a home-made bullet (Small Arms Survey, 2005, p. 15). One advantage of the self-assembly and hand-loading of ammunition by civilian gun owners is that a completed round will be cheaper than if bought fully assembled in a shop (RCBS, 2006). In addition, hand-loading can be a hobby for shooters and hunters who want to 'fine-tune' ammunition 'to fit a specific gun and certain type of shooting' (RCBS, 2006).

An overview of the ammunition industry

As indicated above, a useful distinction can be made in the ammunition industry between profit-oriented manufacturers competing for customers in ammunition markets and state-owned producers that produce exclusively for domestic

armed forces. Following on from this, a distinction can also be made between the trends and developments that have affected the two types of manufacturers. While there appears to have been little change in the operation and structure of small-scale, state-owned facilities, noticeable changes have taken place over the past decade or so to the ammunition industry in the Western world. Reduced military spending in the United States and Europe after the end of the cold war led to mergers, consolidations, and other measures taken by manufacturers to ensure their continued profitability.²³ In developing countries there are also examples of recent efforts to upgrade and modernize existing production facilities.

The small arms ammunition industry

One noticeable development in the small arms ammunition industry in the Western world is the emergence of fewer—albeit larger and sometimes transnational—producers. For example, in 2002 the Swiss arms and ammunition producer RUAG bought the German small arms ammunition producer Dynamit Nobel to create RUAG Ammotec (RUAG, n. d., a). RUAG Ammotec, which produces small arms ammunition and ammunition components for military forces, law enforcement agencies, and sport and hunting purposes, currently operates production facilities in Germany, Sweden, and Switzerland (RUAG, n. d., b).

Similarly, the Nordic Ammunition Company (Nammo) was established in 1998 as a result of the merger of the ammunition manufacturing activities of Raufoss Technologies in Norway, Celsius in Sweden, and Patria Industries in Finland (Nammo, 1999). Nammo operates production facilities in Finland, Germany, Norway, Sweden, and the United States (Nammo, 2006).

There has been a parallel trend towards the consolidation of small arms ammunition producers at the national level. For example, the Canadian SNC Technologies has, through mergers over the past decades, established itself as the only domestic producer for the Canadian military market of small-, medium-, and large-calibre ammunition, as well as hand and rifle-grenades.²⁴ Similarly, US production of military small calibre ammunition is currently concentrated in a single facility, the Lake City Army Ammunition Plant, down from five facilities at the time of the Vietnam War (Merle, 2004).

Licensed production and cooperation agreements

There is a notable absence of licensed production agreements in the small arms ammunition industry. Design standards for small arms ammunition are often available to producers without any need to enter into a contract and pay royalties to the manufacturer, which may have developed the original design of what later became a widely accepted standard for a particular calibre. The Belgian arms and ammunition producer FN Herstal, for instance, was the original manufacturer of 5.56 x 45 mm ammunition, which was later adopted as a NATO standard.²⁵ However, the adoption by NATO of FN Herstal technical designs did not imply exclusive rights for FN to produce this ammunition. NATO regulations require its design standards to be made public to allow production by other manufacturers.²⁶ Instead, the adoption by NATO of the FN design implied an 'image boost' for FN Herstal, as well as several service contracts between FN and other producers under which FN assisted these producers to adjust and optimize their production lines for the manufacture of the 5.56 mm NATO ammunition.²⁷

Similarly, design standards for other small arms ammunition such as 7.62 mm NATO ammunition or 9 mm ammunition are set by various manufacturers around the globe without any licensed production deals underpinning the production.²⁸ At the same time, cooperation agreements and, as indicated above, service contracts do exist between producers who otherwise operate independently from one another. An example, again involving FN Herstal, is the cooperation agreement announced in September 2005 between FN and the Italian Fiocchi Munizioni for production by Fiocchi at its facilities in Italy and the United States of 5.7 x 28 mm ammunition (FN Herstal, 2005). This calibre has been developed by FN for exclusive use in certain of its small arms such as FN Herstal 'P90' sub-machine guns.²⁹ The advantage to FN from the deal is that it will help ensure that there are sufficient ammunition supply capacities for military and law enforcement clients using these small arms in Europe, and the United States and Canada.³⁰

Rehabilitation, modernization, and establishing production facilities

It is normal in the small arms ammunition industry for production machinery to experience a fall in output quantity over time.³¹ Consequently, producers

are often interested in mechanisms that will help them to maintain or modernize production capacities.³² For example, the Mzinga Corporation in Tanzania was set up in 1971 with Chinese equipment to produce 7.62 x 39 mm ammunition for use in Kalashnikov-type assault rifles.³³ Because of its ageing machinery, current annual output (of this calibre) by Mzinga is alleged to have dropped from 7 million rounds to little more than 1 million rounds.³⁴ This amount falls significantly short of the estimated annual domestic consumption of 10 million rounds of ammunition of this calibre used for tactical and training purposes by the military, police, prison services, and national park services.³⁵

In order to restore its capacities, the Mzinga Corporation concluded a deal in 2004 with the Belgian New Lachausée for a EUR 12 million production line producing 7.62 x 39 mm ammunition and auxiliary equipment.³⁶ In the end, this deal did not lead to the transfer of the production line because the export authorities in Belgium denied it an export licence in June 2005 (Gouvernement Wallon, 2005, point 3). The reason for the denial was the perceived incompatibility of the transfer 'with the foreign policy and international obligations of Belgium' as well as concerns about the enforceability of the end-user conditions that had been placed on the transfer (Gouvernement Wallon, 2005, point 3).³⁷ These had included that the ammunition produced with the transferred equipment would only be used for domestic purposes, that the existing production line would be dismantled and destroyed, and that any ammunition produced would be adequately marked. The conditions had been sought in order to limit the risk of diversions or undesirable exports of ammunition produced by the transferred equipment (Gouvernement Wallon, 2005, point 1; Mwakisya, 2005).

There are examples of recently established production centres. The United Arab Emirates (UAE), for instance, set up Adcom Manufacturing, its first small-calibre ammunition factory, in 1997. The company uses modern production technologies from France, Germany, and the United States and specializes in the production of high-quality small arms ammunition for military and law enforcement markets. According to company information, Adcom Manufacturing was also the first producer in the region to market its products internationally (United Arab Emirates Interact, 1998). Another recently established production centre is the Lithuanian state enterprise the Giraites Armament Factory (Giraites Ginkluotes Gamykla, GGG). The plant was set up in 2000 and specializes in

the production of NATO-standard 5.56 mm and 7.62 mm ammunition for military markets as well as bullets for these calibres (GGG, 2005a and b).

Providers of small arms ammunition production capacities

A small but important sector in the small arms ammunition industry is the provision of modern production equipment for high-quality ammunition. Industry insiders claim that the vast majority of existing production facilities for small arms ammunition for state-actor markets are equipped with machines from the two traditional market leaders in this sector.³⁸ These two long-established companies are the German company Fritz Werner, which was merged in 2002 into the German provider of industrial plants MAN Ferrostaal (MAN Ferrostaal, n. d.), and the French Manurhin Equipment.³⁹ The Belgian company New Lachaussee entered the market at a later stage.⁴⁰ According to information published by New Lachaussee it exports 95 per cent of its products, which are marketed in 86 countries in *inter alia* Latin America, Africa, the Middle East, and Asia (New Lachaussee, n. d., a and b).

In addition to these main providers specializing in ammunition production equipment, there are also smaller-scale providers. These include the Belgian FN Herstal, which helped establish the Kenya Ordnance Factory at Eldoret in the 1990s. The Eldoret plant is alleged to have an annual output capacity of 20 million rounds of 7.62 mm ammunition (Stohl, 1998a, p. 14). Other small-scale providers of production equipment in the West include the US company Mast Technology, which markets new and second-hand small arms ammunition production equipment. According to company information, the customers for this machinery include 'all major US producers as well as other manufacturers in Mexico, Central and South America, Europe, Africa, Australia and Asia' (Mast Technology, 2006b).

There are also a number of non-Western providers of production plants and equipment for small arms ammunition. China, for instance, is reported to have provided ammunition production machinery to several states in sub-Saharan Africa, including Tanzania, Uganda, and Zimbabwe (Mlambo, 1998; Ochieng et al., 1999; Mwakisyal, 2005). Iran is reported to have offered in 2005 to provide Sri Lanka with a small arms ammunition production plant for 7.62 mm ammunition at a cost of USD 1.1 million (Karniol, 2005). Other non-Western

states that have allegedly exported production equipment for small arms ammunition include Brazil, India, Israel, Pakistan, Singapore, and South Korea (Stohl, 1998a, p. 12).

The production of sophisticated ammunition for light weapons

In contrast to the production of small arms ammunition, the production of sophisticated ammunition such as guided missiles for man-portable air defence systems (MANPADS) and anti-tank guided weapons (ATGWs) is restricted to those states with an advanced national arms industrial base. Preliminary research has identified 25 countries that manufacture MANPADS and ATGWs, using either indigenous or imported designs: Bulgaria, China, Egypt, France, Germany, India, Iran, Israel, Italy, Japan, North Korea, Pakistan, Poland, Romania, the Russian Federation, Serbia and Montenegro, Singapore, Slovakia, South Africa, Spain, Sweden, Switzerland, the UK, the United States, and Vietnam. Of these countries, ten (Bulgaria, Egypt, North Korea, Pakistan, Poland, Romania, Singapore, Slovakia, Switzerland, and Vietnam) produce copies of MANPADS and ATGWs based on foreign designs (Small Arms Survey, 2004, p. 82; Jones and Cutshaw, 2005).

One reason for the restricted number of producers of guided light weapons ammunition is that the number of customers for such ammunition and the quantities required by these customers are lower than for small-arms ammunition.⁴¹ Production of guided ammunition also presents technological challenges. Such challenges are exemplified by the programme delays in India to the development of the 'Nag' ATGW. While Nag was first test-fired in 1990, full-scale production had not started by mid-2005 because of several problems, including one related to the development of the sensor-based infrared seeker guidance system for the missiles (Pandit, 2005).

Cooperation agreements can also be found among producers of guided light weapons ammunition. For example, it was reported in early 2004 that the Polish state-owned Zakłady Metalowych Mesko SA had signed a co-production deal with the Israeli producer Rafael Armament Development Authority (Rafael) for the production of the 'Spike' ATGW. The original basis of the deal was a defence contract concluded in 2003 between Israel and Poland for the production and supply of Spike missiles by Rafael to the Polish Army (Hancock,

2004). From 1989 until late 2004, a consortium of Western European companies, the Stinger Project Group, also produced 13,500 'Stinger' MANPADS under contract with the United States for end-users in Germany, Greece, the Netherlands, and Turkey (Preylowski, 2004, p. 2).

The scope for controls on ammunition production

Strict controls on the industrial manufacture of ammunition, and on the transfer of such ammunition, must be a key aspect of efforts to combat the illicit trade in small arms and light weapons ammunition in order to prevent ammunition diversions into the illicit sphere. Such efforts should also include strict controls on the transfer of production capacities for small arms and light weapons ammunition, including controls on transfers of ammunition components for assembly abroad.

Controls on transfers of production capacities

A responsible attitude towards the transfer of production technology and equipment is essential to any controls on the ammunition trade. Such transfers can lead to the establishment of future sources of potential ammunition proliferation. Germany, for instance, in the 1960s and 1970s helped to establish indigenous small arms ammunition production capacities in newly independent states by granting export licenses to Fritz Werner for transfers of production technology and equipment. One purpose of these deals was to help these states meet their national defence needs.⁴² Authorization by Germany for these exports was tied to end-user undertakings by the recipient governments that the ammunition produced would be used only by state actors and for domestic consumption.⁴³

Some of the transfers authorized by Germany have had undesirable consequences, underlining the long-term risks involved in authorizing transfers of production equipment. For example, recipients of production equipment from Fritz Werner in the 1960s and 1970s included the governments of Iran and Pakistan.⁴⁴ Regime changes in these countries led to the emergence of governments that do not consider themselves bound by the end-user undertakings of their predecessors. Both Iran and Pakistan now export small arms ammunition that, according to industry insiders, is produced in the domestic production

centres that Fritz Werner once helped to establish.⁴⁵ Moreover, the German government has very few means at its disposal to verify that other states that gave end-user undertakings in relation to their imported ammunition production equipment are in compliance with those undertakings.⁴⁶

A more recent example that has raised concerns is the authorization by the Belgian government in 1997 for FN Herstal to export production equipment for small arms ammunition to the Kenyan Eldoret facility (Stohl, 1998a, p. 14). The authorization is reported to have been conditional on 'written assurances that ammunition from the Eldoret plant would not be exported to neighbouring Great Lakes countries' (Stohl, 1998a, p. 14). While there is no proof that Kenya is in violation of its end-use assurances, there have been allegations that ammunition produced at Eldoret was transferred to regional conflicts (reported in Berkol, 2002, p. 11, fn. 10). These allegations persist partly because of the continuing absence of transparency on the part of the Kenyan authorities about the annual output and the range of calibres, as well as about transfers and their recipients, of ammunition produced at Eldoret (Kwayera, 2003).

Another important area for the control of ammunition is a responsible attitude towards transfers of the components required for the assembly of ammunition. Strict controls on transfers of primers for small arms ammunition are of particular relevance because there are fewer producers of primers than of cartridge cases and bullets (see above). It has been suggested that regulating the production and transfer of ammunition components that are produced by only a small number of companies could be a possible choke point for control (Stohl, 1998b). It seems fair to say that, in order to be effective, controls on the ammunition trade would need to apply not only to transfers of fully assembled ammunition, but also to transfers of components required for the assembly of ammunition. Nonetheless, targeted controls on components would not affect production at facilities known or suspected to be sources of undesirable ammunition proliferation which have an in-house capacity to manufacture ammunition components.

Existing standards on transfers of production capacities

Explicit controls on transfers of production capacities, including on transfers of components for small arms and light weapons ammunition, currently exist only in the Wassenaar Arrangement (WA)⁴⁷ and the EU.⁴⁸ The arms export control

lists agreed in these forums encompass fully assembled ammunition as well as components for ammunition used in light weapons and 'military' small arms (WA, 2005, category ML3; EU, 2003a). They also include equipment required for the production, as well as technology required for the development and production, of products included on the control lists (WA, 2005, categories ML18 and ML 22; EU, 2003a).

Smooth-bore weapons and their ammunition used only for hunting and sporting purposes (WA, 2005, category ML1, note 1; EU, 2003a) are excluded from the scope of the WA and EU control lists.

States parties to the WA and EU member states make a political commitment not to authorize exports of controlled small arms and light weapons ammunition and related production equipment and technology if there is an unacceptable risk that 'the equipment will be diverted within the buyer country or re-exported under undesirable conditions' (EU, 1998, criterion 7; WA, 2002, point I.1.j). It would be desirable for these EU and WA standards to be adopted as common minimum standards applied by all states from which production capacities for small arms and light weapons ammunition could be exported. Importantly, EU member states have also agreed to consider at the export licensing stage 'the potential use of the finished product in the country of production and of the risk that the finished product might be diverted or exported to an undesirable end-user' (EU, 2003b, p. 5, point II.5). This is critical because, although a production line would be an unlikely instrument to be used in, for example, human rights violations, ammunition derived from the machinery could certainly be used in such violations.

At the same time, it should be pointed out that there are potential loopholes in these existing standards. For example, there are, as indicated above, no explicit standards in these forums on the transfer of production capacities for 'civilian' small arms ammunition used exclusively for hunting and sporting purposes. This represents a potential loophole because certain types of 'civilian' small arms ammunition are very similar to 'military' small arms ammunition. This means that a manufacturer with a capacity to produce, for example, .308 Winchester or .223 Remington ammunition will generally be able to use the same production equipment for the manufacture of 7.62 x 51 mm and 5.56 x 45 mm ammunition for 'military' small arms.⁴⁹

Furthermore, multilateral standards on ammunition production capacities should clarify that they apply not only to the export of physical equipment and other items such as blueprints, but also to service contracts and the provision of technical training to ammunition producers located abroad.

The need for adequate control standards at the export licensing stage is further underlined by the fact that, as suggested above, once production capacities have been exported and established, the exporting state may have little leverage over the policies of the producing state regarding future use and transfer of the ammunition. Moreover, adequately trained technicians will often be in a position to copy and duplicate existing production equipment in order to increase domestic output capacities.⁵⁰ South Africa, for instance, is alleged to have increased national output capacities for small arms ammunition when the UN arms embargoes were in place between the 1960s and the early 1990s⁵¹ by the use of reverse engineering on previously imported production equipment.⁵²

Conclusion

A survey of existing information about the production of small arms and light weapons ammunition shows that production capacities have been transferred from a limited number of original designers to a large number of manufacturers across the globe. Small arms ammunition is now manufactured at numerous locations in all regions of the world. Production of guided ammunition for light weapons is less widespread. An important control measure in relation to future global production is the strict control of transfers of ammunition production capacities that can be used to establish, maintain, or upgrade ammunition production and assembly facilities.

As a minimum, states should ensure that export authorizations for transfers of ammunition production capacities, including ammunition components, are denied if there is a clear risk that the ammunition produced with the imported equipment or components would be diverted into the illicit sphere, transferred to undesirable end-users, or employed in undesirable end-uses. Furthermore, states should be more transparent about the number of small arms and light weapons ammunition producers on their territory. Ammunition production facilities should be more transparent about their levels of output and their

range of products, as well as internal industry transfers of components and capacities. Such transparency is essential to the development of better targeted controls on the production of small arms and light weapons ammunition as a means to combat illicit transfers of this ammunition. ■

List of abbreviations

ATGW	Anti-tank guided weapons
EU	European Union
GGG	Giraites Ginkluotes Gamykla (Lithuania)
GRIP	Groupe de Recherche et d'Information sur la Paix et la Sécurité (Belgium)
MANPADS	Man-portable air defence systems
NATO	North Atlantic Treaty Organisation
SACDI	Southern African Centre for Defence Information
UAE	United Arab Emirates
UNGA	UN General Assembly
WA	Wassenaar Arrangement

Endnotes

- 1 This chapter is based on a draft by Rheinilde Weidacher. It is complemented by research undertaken by the Groupe de Recherche et d'Information sur la Paix et la Sécurité (GRIP) in 2005 that included interviews with representatives of producers of ammunition for small arms and light weapons conducted at international defence market fairs in London (September 2005) and Paris (November 2005), personal visits to production sites in Belgium (April 2005) and Germany (May 2005), as well as contacts by phone and email. In total, 17 ammunition producing and trading companies responded to questions. The interviewees included representatives from three companies that are global providers of small arms ammunition production machinery. The interviewed companies are located in Austria; Belgium; Brazil; China; Finland; France; Germany; Italy; Pakistan; Russia; South Africa; and Switzerland.
- 2 Interviews (note 1).
- 3 Interviews (note 1).
- 4 Interviews (note 1).
- 5 Interviews (note 1).
- 6 Interviews (note 1).
- 7 Interview in Geneva in September 2005 with a member of the 1999 UN Group of Experts on the problem of ammunition and explosives.
- 8 Interviews (note 1).

- 9 Interviews (note 1).
- 10 Interviews (note 1).
- 11 For a discussion by civilian shooters about the advantages and disadvantages of using 5.56 mm NATO or .223 Remington ammunition for specific purposes see <<http://www.thenationofriflemen.org/oldnor/index.php/forums/viewthread/5848/>>.
- 12 See, for instance, the 'PCX' cartridge load and assembly machine available from Manurhin Equipment at <<http://www.manurhin-mre.com/english/produits.htm>>.
- 13 Interviews (note 1).
- 14 Interviews (note 1).
- 15 Interviews (note 1).
- 16 Interviews (note 1).
- 17 The figure of 13 billion rounds was calculated by adding figures produced by Forecast International for production in Europe, the United States, and by non-US and non-European producers (Forecast International, 2005). Forecast International includes in its figures ammunition of 12.7 mm to 15.5 mm calibre. The global annual figure for production of small arms ammunition as defined in this chapter is therefore likely to be lower than 13 billion rounds.
- 18 Interviews (note 1). There is a list of relevant NATO Standardization Agreements on ammunition for small arms and light weapons at <<http://otan.w3sites.net/OTAN/cgi-bin/motcle.pl?motcle=ammunition&critere=Num%E9ro+de+stanag+dans+l%27ordre+croissant>>.
- 19 Interviews (note 1).
- 20 Interviews (note 1).
- 21 Interviews (note 1).
- 22 Interviews (note 1).
- 23 Interviews (note 1).
- 24 Interview with SNC Technologies at a London trade fair, September 2005.
- 25 Interview with FN Herstal, Belgium, April 2005.
- 26 Interview with FN Herstal, Belgium, April 2005.
- 27 Interview with FN Herstal, Belgium, April 2005.
- 28 Interviews (note 1).
- 29 Interview with FN Herstal, Belgium, April 2005.
- 30 Interview with FN Herstal, Paris, November 2005.
- 31 Interviews (note 1).
- 32 Interviews (note 1).
- 33 Interview in Brussels in September 2005 with a member of the expert mission that went to Tanzania on 6–10 June 2005 to verify information that had been submitted by the Tanzanian authorities to the Walloon government in Belgium in the context of an application to export small arms production equipment to Tanzania (GRIP, 2005, p. 8, box 2).
- 34 The figure of 1 million rounds was cited by the Tanzanian authorities to the expert mission to Tanzania in June 2005 (see note 33).
- 35 This figure of 10 million rounds was cited by the Tanzanian authorities to the expert mission to Tanzania in June 2005 (see note 33).
- 36 Interview with member of the expert mission to Tanzania in June 2005 (see note 33).
- 37 In its original language the relevant passage in the decision by the Walloon government reads: 'le Gouvernement estime que l'octroi de la licence n'est pas opportun dans le contexte actuel d'analyse [...] pour motifs d'incompatibilité avec la politique étrangère et les engagements internationaux de la Belgique et impraticabilité de l'imposition de conditions supplémentaires à l'octroi de la licence' (Gouvernement Wallon, 2005, point 3; translation by the author).

- 38 Interviews (note 1).
- 39 Interviews with Fritz Werner Industrieranlagen (visit to site, May 2005) and Manurhin Equipment (by telephone, May 2005); interviews (note 1).
- 40 Interviews (note 1).
- 41 Interviews (note 1).
- 42 Interview by GRIP with German arms export official, Federal Ministry of Economics, Berlin, 14 June 2004.
- 43 Interview by GRIP with German arms export official, Federal Ministry of Economics, Berlin, 14 June 2004.
- 44 Interview by GRIP with German arms export official, Federal Ministry of Economics, Berlin, 14 June 2004; interview with Fritz Werner Industrieranlagen (visit to site, May 2005).
- 45 Interview with Pakistan Ordnance Factories at a London trade fair (September 2005); interview with Fritz Werner (visit to site, May 2005); interviews (note 1). For volumes of ammunition exports by Iran and Pakistan and export destinations see for instance the database of authorized transfers of small arms and light weapons at the Norwegian Initiative on Small Arms Transfers: <http://www.nisat.org/methodology/TDB_home.htm>.
- 46 Interview by GRIP with German arms export official, Federal Ministry of Economics, Berlin, 14 June 2004.
- 47 The 40 participating states in the Wassenaar Arrangement on Export Controls for Conventional Arms and Dual-Use Goods and Technologies are: Argentina, Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Latvia, Lithuania, Luxembourg, Malta, Netherlands, New Zealand, Norway, Poland, Portugal, Republic of Korea, Romania, Russian Federation, Slovakia, Slovenia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and the United States. <<http://www.wassenaar.org/participants/index.html>>
- 48 The 25 member states of the European Union are Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, the Netherlands, and the United Kingdom. <http://www.europa.eu.int/abc/governments/index_en.htm#members>
- 49 Interviews (note 1).
- 50 Interviews (note 1).
- 51 The UN Security Council first imposed a voluntary arms embargo on the South African Apartheid regime in 1963. This became a mandatory arms embargo in 1977. The embargo was lifted in 1994 (see UN, 2002).
- 52 Interview with representative of ammunition machinery provider who visited production sites in South Africa in the mid-1990s (May 2005).

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Small arms ammunition is often traded separately from the weapons for which it is manufactured.
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