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Ammunition Depot Explosions[1]

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Overview

In almost all post-conflict environments and in many developing countries, the physical risk to communities from the presence of abandoned, damaged, or inappropriately stored and managed stockpiles of ammunition and explosives can be significant. Table 13.1 summarizes those accidents resulting in explosions in ammunition depots that have been identified from open source information, although it is very likely that there will have been more incidents than this. It

Table 13.1
Summary of known explosive events in ammunition depots, 1995–2007[2]

Year	Number of countries	Number of explosive events	Casualties	
			Fatalities	Injuries
1995–2000	11	31	351	636
2001	10	16	80	243
2002	11	16	1,587+*	557
2003	9	21	166	356+
2004	10	16	88**	1,290+***
2005	16	21	159	529+
2006	15	18	11	128
2007	12	14	133+	525+
Total		**153**	**2,575+**	**4,264+**

* Includes 1,500 fatalities in one incident in Nigeria.

** Does not include unconfirmed reports of more than 1,000 fatalities in North Korea.

*** Includes more than 1,200 injuries from a separate confirmed explosion in North Korea.

Source: SEESAC (2007b)

should also be noted that two particular incidents (in Nigeria in 2002 and Mozambique in 2007) heavily impact on the statistics for those particular years.

Further analysis identifies those countries where there have been, or still are, obvious problems with ammunition safety in storage from the frequency of accidents over the period. The data does not identify any relationship between the number of fatalities and injuries per explosion, but this is not surprising, considering the number of variables involved, i.e. size of stockpile, ammunition types, proximity of a civilian community, time of explosion, etc. (see Table 13.2).

Table 13.2
Known explosive events in ammunition depots by country, July 1995–June 2007

Country	Number of explosive events	Casualties		Remarks
		Fatalities	Injuries	
Afghanistan	16	199	452+	
Russian Federation	16	35	94	
Albania	16	57	64	15 incidents during the political instability of 1997
Iraq	12	131	90	
India	10	35	67	
Ukraine	6	7	17	4 incidents at Novobogdanovka
Mozambique	5	115+	464+	4 incidents at Malhazine
Taiwan	5	8	2	
Thailand	5	21	165	
Ecuador	4	10	473	
Kazakhstan	4	0	0	
Sudan	4	82	260+	
Total	**103**	**700+**	**2,148+**	

Source: SEESAC (2007b)

Causes of explosions

There are many possible causes of undesirable explosions in ammunition depots, but they can usually be categorized into to the following generic areas: 1) deterioration of the physical or chemical condition of the ammunition and explosives; 2) unsafe storage practices and infrastructure; 3) unsafe handling and transport practices; or 4) deliberate sabotage.

Regrettably, the dramatic consequences of an ammunition explosion normally make the key witnesses to the event among its first victims. Therefore any subsequent investigation tends to concentrate on the practices and regulations in force at the time, as key witnesses are not available. Due to the fact that a degree of technical knowledge is required for an effective investigation, the investigating authority is also usually the authority responsible for the ammunition management and storage in the first place. This complicates the

Table 13.3

Reported causes of recent ammunition depot explosions, July 1995–June 2007

Cause*	Total	%**
Cause not known or not confirmed	51	33.3
Fire	30	19.6
Movement/handling	21	13.7
Security/sabotage	22	14.4
Auto-ignition of propellant***	8	5.2
Lightning strike	8	5.2
Electrical	5	3.3
Other	8	5.2
Total	**153**	**100.0**

* The causes are as stated in official reports or confirmed press reports. They may not necessarily be completely accurate, as the efficiency of the incident investigations could not be verified by SEESAC. The exact cause is sometimes difficult to establish, due to the destruction of evidence.

** The total of the figures given is not exactly 100, due to rounding.

*** This is a major risk where ammunition surveillance is limited or non-existent, but a minor risk where appropriate ammunition surveillance practices are applied.

Source: SEESAC (2007b)

impartiality and independence of the investigation, and can lead to a reluctance to allocate responsibility.

The limited information available suggests several major causes of the known explosions (see Table 13.3).

The cause of fire is not identified in the data available. A percentage of this figure will relate to external fires resulting in explosions, such as the one in Nigeria in 2002, but some causes will be fires accidentally started during inappropriate activities within ammunition storage areas, or unidentified auto-ignition of propellant. What is of more concern, however, is the number of events where the cause is not known. This suggests either a lack of transparency on the part of the authorities, or a shortage of the technical skills necessary to properly investigate such accidents. In either case, it means that the remedial action necessary to prevent a recurrence is unlikely to take place, and further explosions should be expected.

The three major causes identified from the current available data strongly suggest that the risk of undesirable explosions can be significantly reduced by: 1) sound training; 2) the development of appropriate ammunition management systems (CHAPTER 8); 3) the short-term prioritization of stocks for destruction; and 4) their subsequent destruction on a priority basis (CHAPTER 9).

Impact of explosions

The damage, casualties, and impact on communities of an explosion within an ammunition depot can be devastating, and the economic costs of the subsequent explosive ordnance disposal clearance can be far greater than the prior implementation of safer procedures, limited infrastructure development, and stockpile disposal would have been. It is difficult to identify the real costs of clearance, as in cases where this has happened, the government financial systems have lacked the sophistication to accurately estimate the real costs. Yet a comparison with the costs of humanitarian mine and unexploded ordnance (UXO) clearance would not be inappropriate in terms of costs per square metre.[3]

It is also important to remember that there will inevitably have been a number of 'near misses', where an undesirable explosive event has been prevented or contained by the ammunition management or storage practices in place at the time. A major problem, however, is that during conflict, in post-

conflict environments, or during force restructuring as part of security sector reform, the specialist technical personnel that should be responsible for ammunition management may well have become casualties or left the armed forces, and they are very difficult to replace without a comprehensive and effective training programme.

There are also economic costs in terms of the capital value of the stockpile itself, although this is really a factor for national consideration. National funds that are used for the replacement of destroyed ammunition stocks could potentially have been committed to social and economic development. Such replacement costs can run into millions of dollars. As an example, the ammunition explosion in Bharatpur, India on 28 April 2000 resulted in an estimated ammunition stock loss of USD 90 million. This explosion was the result of a fire at the ammunition depot, which was exacerbated by excessive vegetation. Ironically, the grass had not been cut for two years as a cost-saving measure. In this case, prevention would certainly have been cheaper than the resultant cure.

Progress to date

Ammunition depot explosions continue to kill and injure many hundreds of people each year. While some states have made great advances in managing ammunition stockpiles, they remain few in number.

Several developed countries offer both unilateral and multilateral assistance programmes that are designed to improve the management and physical security of stockpiles. These programmes include comprehensive stock auditing, assessments of risk (of both explosion and diversion), improvements to the physical storage of arms and ammunition, and training and assistance for stockpile management personnel. Despite the range of measures on offer, however, relatively few states have requested stockpile management assistance.

Assistance agency representatives repeatedly stress that the problem stems from a lack of information on the subject by recipient governments and security forces. On the one hand, many states remain unaware of the fact that their stockpiles are unsafe. On the other hand, the means to identify these problems—comprehensive improvements to stockpile management—remain nascent because states are unaware of the potential benefits of improved

stockpile management. Donor states and international agencies clearly have a critical role to play in better promoting assistance programmes and advertising the benefits—whether from an economic or public safety perspective—that these programmes can offer.

Conclusion

The frequency of undesirable explosions of ammunition storage depots has been increasing over the last five years. This trend can only continue as the surplus stockpiles remaining from the cold war and previous conflicts continue to deteriorate. Ineffective stockpile management in many countries, combined with the slow pace of destruction, means that further explosive events will inevitably occur and more innocent lives will be lost.

Yet many explosive events in ammunition storage areas are preventable by a combination of sound training, the development and implementation of appropriate ammunition management systems, the ongoing short-term prioritization of stocks for destruction, and their subsequent destruction on a priority basis. International focus should be strengthened in these areas.

The economic and social impact of such explosions should not be underestimated, and further research should try to identify these very real costs.

Notes

1 This chapter presents information originally published in Wilkinson (2006). It has been comprehensively updated and amended where necessary.

2 Since 2006 the statistics include incidents during demilitarization and explosive ordnance disposal clearance after a depot explosion.

3 The costs of mine and UXO clearance vary depending on a range of factors, including location, the state of the national economy, topography, type of contamination, etc. Therefore, an 'average' figure is difficult to identify, although many sources suggest that USD 1 per square metre is a sound average (email from Alistair Craib, BARIC Consultants, 28 February 2006).

Further reading

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