

# Journal of Conventional Weapons Destruction

---

Volume 17  
Issue 2 *The Journal of ERW and Mine Action*

Article 4

---

July 2013

## Preventing Unplanned Explosions at Munitions Sites

Chris Loughran  
*MAG (Mines Advisory Group)*

Daan Redelinghuys  
*MAG (Mines Advisory Group)*

Follow this and additional works at: <https://commons.lib.jmu.edu/cisr-journal>



Part of the [Other Public Affairs, Public Policy and Public Administration Commons](#), and the [Peace and Conflict Studies Commons](#)

---

### Recommended Citation

Loughran, Chris and Redelinghuys, Daan (2013) "Preventing Unplanned Explosions at Munitions Sites," *The Journal of ERW and Mine Action* : Vol. 17 : Iss. 2 , Article 4.  
Available at: <https://commons.lib.jmu.edu/cisr-journal/vol17/iss2/4>

This Article is brought to you for free and open access by the Center for International Stabilization and Recovery at JMU Scholarly Commons. It has been accepted for inclusion in Journal of Conventional Weapons Destruction by an authorized editor of JMU Scholarly Commons. For more information, please contact [dc\\_admin@jmu.edu](mailto:dc_admin@jmu.edu).

# Preventing Unplanned Explosions at Munitions Sites

Unplanned explosions at munitions sites (UEMS) frequently result in contamination and destruction similar to that resulting from conflict. Preventive measures can reduce the risk of UEMS and are significantly easier to deploy than clearance after an explosion.

by Chris Loughran and Daan Redelinghuys [ MAG ]

International concern over unplanned explosions at munitions sites (UEMS) has grown considerably in recent years. UEMS have garnered significant media attention as a result of the large number of civilians killed or injured by these explosions. Efforts by states, the U.N., international and nongovernmental organizations (NGO), and research institutes have focused on the scale and nature of the problem while developing initiatives to prevent unplanned explosions.

Tragically, unplanned explosions often occur in populated areas. For example, fire at a munitions site in northern Lagos, Nigeria, caused an explosion in 2002, killing more than 1,000 civilians.<sup>1</sup> In July 2011, a similar munitions explosion destroyed the largest power plant in Cyprus.<sup>1</sup> In 2012, the series of explosions that occurred at a military site in the center of Brazzaville, Republic of the Congo (ROC), was one of the largest incidents in recent years. Immediately following the explosion, global attention focused on the enormous human and economic impact of UEMS.<sup>1</sup>

The Small Arms Survey found 302 instances of unplanned explosions in 76 countries between January 1998 and October 2011.<sup>2</sup> As a result of such explosions, communities are rendered homeless, and rescue workers fight fires and



Munitions stored at this tank regiment barracks in Brazzaville, ROC, exploded on 4 March 2012, killing 223 people and injuring 2,500.

*Photo courtesy of Laudes Martial Mbon/IRIN.*

find survivors and bodies in the rubble of collapsed buildings, all shown on international media and the Internet.

## Consequences of UEMS

Recognition is growing of the long-term social and economic consequences of UEMS, which are typically less visible but extend far beyond the imme-

diated loss of life and the financial costs associated with emergency response. The closure of industrial sites, businesses and trading centers has long-term consequences for business owners and employees. Hospitals, schools and municipal facilities in the blast radius may remain closed for weeks or even years. Government budgets invariably need to



Brazzaville residents camp out on the grounds of a cathedral after they were displaced by a huge explosion at an army barracks in the city.

reprioritize significant costs of reconstruction over multiple years. For example, the Brazzaville explosion destroyed hundreds of homes and businesses, leading to the temporary closure of schools and a hospital. An estimated 5,000 people lost their homes.

From a mine action perspective, emergency response operations need to incorporate explosive ordnance disposal (EOD) support to enable safe access for emergency responders while also systematically identifying and destroying unexploded ordnance (UXO). UXO can be projected a considerable distance from the explosion site and are often highly unstable. In most cases, reporting systems and risk education in communities that have not previously experienced the risks associated with contamination from UXO must accompany EOD operations.

For the international mine action community, UEMS occurring in countries with a limited EOD or mine action-coordination capacity can trigger emergency response deployments and operations usually associated with a post-conflict environment. In many respects, the effect of an unplanned explosion is similar to the impact of conflict, including long-lasting, extensive damage to infrastructure.

### Preventive Measures

While the availability of expert clearance, risk education and coordination support after an incident is important, devoting the same technical expertise and resources to prevent or reduce the risk of such incidents is preferable. Purely in terms of operational costs, post-explosion clearance is vastly more expensive than preventive measures to improve weapons and ammunition management and destroy surplus munitions.

The management of stockpiles is a broad and detailed subject, but the key principles relevant to the causes of UEMS (including the escalation of a single explosive event to a catastrophic disaster like that seen in Brazzaville) are not complex. Munitions do not have an indefinite shelf life; they degrade over time, and storage conditions significantly impact their expected lifespan. Physical factors such as temperature, humidity and rough handling affect shelf life, making explosives unstable and at greater risk of not functioning as intended.

While munitions are designed for continual maintenance throughout their life cycles in ways that maximize shelf life, they also have safety parameters that minimize the effect of an explosive incident. Key safety factors include protection against fire and static electricity (including lightning) as well as stor-





Extensive damage was caused to residential areas of Brazzaville when munitions at an army barracks blew up.

age in “compatibility groups,” with incompatible items (due to their chemical composition or explosive effect) stored separately within a storage site.

Safety measures include what is considered a safe distance for civilians relative to storage locations. These limits reduce the risk of a single explosive incident propagating through the storage area and initiating further explosions that result in large-scale incidents. Frequently, controls over construction and development in close proximity to munitions sites are not implemented, and urbanization dangerously encroaches on depots. This should require a reduction in facilities’ storage quantity or the relocation of facilities to a new site. In many cases, particularly in countries with poor infrastructure, capacity and resources, these essential safety measures are not carried out.

UEMS causes range from mechanical or chemical deterioration of components to internal or external events such as fire and lightning, and include human factors such as improper handling or tampering. These causes often result from inadequate site security. Poor storage practices of temporary or perma-

nent stockpiles may result in an initial explosion leading to multiple explosions, as was seen in the Brazzaville incident. Reducing UEMS risk therefore requires steps to improve the conditions under which munitions are stored and how munitions are managed. This also involves the routine destruction of obsolete or degraded munitions.

Many states have developed detailed standards and procedures to ensure the safe storage and management of military-held munitions. Since their launch in 2011, the *International Ammunition Technical Guidelines* (IATG) have provided a normative framework to improve munitions management.<sup>3</sup> IATGs also offer solutions to prevent UEMS and diversion of munitions from state stocks.

For many states, implementing and managing even the most basic improvements necessary to address the immediate causes of UEMS still face significant challenges, including budget constraints and competing priorities for limited government resources. This is particularly true for countries with poor infrastructure and a lack of technical expertise in munitions man-

agement. Theft presents an additional challenge for countries emerging from protracted conflict.<sup>4</sup>

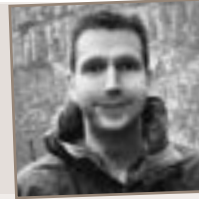
### Technical Assistance

MAG (Mines Advisory Group) provides a range of technical assistance to states, including Burundi, Libya, ROC, and South Sudan, seeking to prevent UEMS. Assistance typically takes the form of storage-facility assessments and training-needs assessments for munitions-storage managers and supervising officers. Assessments also identify surplus and obsolete stocks, inform subsequent training programs and lead to the relocation or physical rehabilitation of facilities. National buy-in for the program is essential, as is local capacity building.

Even in the most complex operating environments, states can implement inexpensive, effective steps, such as evaluating munitions storage procedures and reorganizing munitions within the storage facilities, to improve the safety of their facilities and to gain long-term commitment from donors and greater political support. A small degree of intervention can tangibly address the causes of UEMS and assure security of state stocks over time. Although initial preventive measures may require external technical assistance and donor support, initiatives to prevent UEMS under the broad framework of IATGs can only be truly sustainable and effective in the long term if they are nationally owned and led. ©

## Endnotes

1. "Munition Sites in Populated Areas: Exposing Civilians to Intolerable Danger." *ExplosiveWeapons.info*. <http://bit.ly/1bobq3o>. Accessed 10 June 2013.
2. "Unplanned Explosions at Munitions Sites." *Small Arms Survey*. <http://bit.ly/12fqtNg>. Accessed 10 June 2013.
3. *International Ammunition Technical Guideline*. UN SaferGuard, IATG 01.10:2011, First edition, 1 October 2011. <http://bit.ly/11kYbMt>. Accessed 14 June 2014.
4. *A Review of External Post-Clearance Inspection in Mine Action*. GICHD, 2012. <http://bit.ly/17CkBgG>. Accessed 10 June 2013.



Chris Loughran is director of policy and evaluation at MAG (Mines Advisory Group). He has 11 years' experience in the humanitarian sector and the civil service. Loughran previously managed MAG's conflict recovery program in Iraq and led MAG's internal monitoring and evaluation team. He is currently responsible for MAG's strategic stance on key sector policy issues and evaluation.

---

Chris Loughran  
Director of Policy  
MAG (Mines Advisory Group)  
68 Sackville Street  
Manchester M1 3NJ / UK  
Tel: +44 161 236 4311  
Email: [chris.loughran@maginternational.org](mailto:chris.loughran@maginternational.org)  
Website: <http://maginternational.org>



Daan Redelinghuys is the senior technical advisor at MAG (Mines Advisory Group). He has 32 years' experience working in the field of ammunition and explosives, with 11 years of managing various humanitarian mine action programs in conflict-affected countries. He is the project manager for MAG's global physical security and stockpile management project development.

---

Daan Redelinghuys  
Senior Technical Advisor  
MAG (Mines Advisory Group)  
68 Sackville Street  
Manchester M1 3NJ / UK  
Tel.: +44 161 236 4311  
Email: [Daan.Redelinghuys@maginternational.org](mailto:Daan.Redelinghuys@maginternational.org)  
Website: <http://maginternational.org>