Director Ammunition and Explosives Regulation Annual Report

Fifth Report to the Deputy Minister and the Chief of the Defence Staff

A Review from 1 January to 31 December 2012

National Defence Défense nationale

Canada

Cover Photo:
Petty Officer 2nd Class David Johnston, a Senior Weapons Technician and Torpedo Instructor, prepares the exercise version of the MK48 Heavyweight Torpedo to be fired on board Her Majesty's Canadian Ship (HMCS) Victoria on March 13, 2012.

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Sergeant Langille calls "FIRE" to Gunner Nicholson and Gunner Hughes of D Battery, 2nd Regiment, Royal Canadian Horse Artillery, on Erikfjellet (Erik Mountain) as the 81mm mortar fires a round into the air during a live shoot in preparation for Exercise Cold Response on March 11, 2012.

Captain Matthew Burgher conducts a C6 machine gun proficiency shoot onboard Her Majesty's Canadian Ship Charlottetown's Sea King helicopter in the Gulf of Aden while on Operation ARTEMIS on May 20, 2012.

Executive Summary

Introduction

This is the fifth annual report to the DM and CDS from the Director Ammunition and Explosives Regulation (DAER). It provides an independent analysis of the state of ammunition and explosives (A&E) safety programs and practices across the Department and CAF, risk management of activities involving A&E, and compliance with regulatory requirements.

This is the first report not prepared under the direction of the founding director of DAER, André Pelchat, who is moving on to new challenges within the department. With this change, readers may note some differences in writing style and focus, however we are continuing with the basic structure and content, with the intent of maintaining consistency of perspective on year-over-year progress in key areas.

The ammunition and explosives regulatory program in DND and the CAF supports two corporate priorities:

- Operational Priority – Ensuring Sustainable Operational Excellence Both at Home and Abroad. It facilitates and encourages appropriate management of risk associated with the possession and use of ammunition and explosives with a view to minimizing non-battle casualties and damage that would impair combat effectiveness; and

- Management Priority – Maintaining Defence Affordability. It contributes to the integration of risk and performance management into defence planning and management by strengthening capacity to manage risks associated with the possession and use of ammunition and explosives. The objective is to reduce casualties, damage and other losses to valuable human and materiel resources.

The disciplined and informed management of risk in the acquisition, storage, handling, transportation and use of ammunition and explosives requires sustained effort at all levels of

the organization, but it is at the strategic level where systemic or business-wide issues can be best addressed. Hence, these annual reports are primarily aimed at the strategic leadership of DND and the CAF, although leaders at all levels will find them of use.

2012 Key Issues

The 2012 report provides a "health check" on the state of safety and risk management in ammunition and explosives-related activities of DND and the CAF for the past calendar year, an overview of the main activities of the regulator's office, and a forecast of planned activity for the next two years (2013-2014).

A number of specific issues are highlighted. Two of these require urgent attention on the part of ammunition program leadership and the wider institution. These are: resolution of continuing widespread deficiencies in ammunition inventory management and control practices; and institutionalizing permanent fixes for the significant problems identified in ammunition management in deployed operations. If not properly resolved, these latter issues especially have potential to lead to major consequences in future missions.

Lack of an effective demilitarization solution is another area of concern, although a strategy is now in place to deliver a contracted capability within the next two or three years. This will enable the department to progressively reduce its munitions scrap and obsolete ammunition holdings to more manageable levels, reduce pressure on storage capacity and reduce surveillance costs.

2012 Assessment

In order to provide senior management with an overall assessment of the state of explosives safety compliance and risk management in DND and the CAF, a summary view was introduced in the 2010 annual report, modified from selected key elements of the Treasury Board Management Accountability Framework (MAF). This view has been found to have been useful and is now a permanent feature of these reports. It is presented in the last section of the report and provides a high-level perspective of the current strengths and weaknesses of the DND/CAF ammunition program from a regulatory and safety perspective.

The overall rating remains unchanged from 2011 at "Opportunity for Improvement". However, measurable progress has been made in a number of areas and good foundational work that will pay off going forward has been done. In particular, throughout 2012 the Department put considerable energy into analysis of its management of the ammunition program, and developing potential improvements. This foundational work, if followed up in 2013 with decisions and action, should provide a significant payback going forward in terms of improved strategic coherence, more effective program delivery, overall reduction of program risk and better risk management.

It is also important that the rating be viewed in the broad context of the scale and scope of DND and CAF operations, where it must be said that oversight, control and risk management of activities involving ammunition and explosives are adequate in most cases. However, there continue to be worrying exceptions, particularly in deployed operations, and there are other clear indicators of structural weaknesses that, if not addressed, have the potential to allow circumstances to develop over time that could cause a major event.

These issues need to be tackled strategically, and of the many identified in this report as requiring management attention, the areas we believe merit the greatest focus are:

- Improving control and management of A&E support activities in deployed operations;
- Establishment of effective strategic-level executive leadership and governance of the ammunition program;
- Strengthening ammunition inventory control and accounting, from both a systems perspective and correcting improper practices;
- Strengthening management of the specialist Communities of Practice essential to successful program delivery; and
- Completing modernization of the A&E policy suite.

Conclusion

DAER will continue to focus effort on completing needed work within its purview in consultation with stakeholders. We will also continue to support the Department and CAF in their efforts to achieve all of these important ends by actively working with the responsible authorities on the identification and implementation of good solutions, and by continuing to inform senior management about the state of compliance with A&E regulatory requirements, effectiveness of risk management, and state of A&E safety programs and practices across the institution.

General Walt Natynczyk, former Canadian Chief of Defence Staff, fires a Lee Enfield rifle at the firing range under the watchful eye of MCpl Audry Pardy, a Canadian Ranger with the Cartwright Patrol, at CFB Goose Bay in April 2012.

Section 1
Introduction

Background

This is the fifth annual report to the DM and CDS from the Director Ammunition and Explosives Regulation (DAER) and the first not prepared under the direction of its founding director, André Pelchat. Mr. Pelchat, having established and led the development of the DND/CAF ammunition and explosives regulatory and safety framework over the past five years, is moving on to new challenges within the department. The organization he built, however, endures and will continue working to improve its programs and services in collaboration with the wider defence institution.

With this change of leadership readers may note some differences in writing style and focus from previous reports, however we are continuing with the basic structure and content of previous years, with the intent of maintaining consistency of perspective on year-over-year progress in key areas.

Ammunition And Explosives Regulatory Program

DAER is the DND/CAF regulatory authority for ammunition and explosives. Activities under the direction or control of the MND are exempt from the provisions of the Explosives Act, but DND and the CAF are required to ensure effective control and management of their use of ammunition and explosives. DAER provides the responsible chain of command with relevant policy and procedural direction and advice on how to do so prudently and safely within the defence context.

The ammunition and explosives regulatory program in DND and the CAF is aimed at supporting two corporate priorities:

- Operational Priority – Ensuring Sustainable Operational Excellence Both at Home and Abroad. It aims to facilitate and encourage appropriate management of risk associated with the possession and use of ammunition and explosives with a view to minimizing or preventing non-battle casualties and damage that would impair combat effectiveness; and

- Management Priority – Maintaining Defence Affordability. It contributes to improving the integration of risk and performance management into Defence Planning and Management processes by strengthening the institution's capacity to manage risks associated with the possession and use of ammunition and explosives. The objective is to reduce casualties, damage and other losses to valuable human and materiel resources. In achieving this objective, there is a secondary benefit in preserving public confidence in National Defence's stewardship of these resources.

Purpose Of The Annual Reports

Consistent with these priorities, the prudent, disciplined and informed management of risk in the acquisition, storage, handling, transportation and use of ammunition and explosives is important to successful delivery of the defence mission. Upon it hinges preservation of important aspects of CAF operational effectiveness, the safety of our personnel (and often the public), preservation of essential infrastructure, materiel and other resources, and our reputation as competent managers of our business.

Risk management needs to be the subject of constant focus and will only be effective if done systematically across the business. The institution cannot afford to create conditions where wider systemic issues and risks are not addressed because of dispersed or confused accountabilities. In such an environment, circumstances may arise from time to time where multiple seemingly minor risks will combine to create higher aggregate risk of a major event. This is a recurring issue in defence ammunition supply chains around the world and advanced countries are not immune from the phenomenon.

While effective management of risk requires sustained effort at all levels of the organization, it is at the strategic level where systemic problems or business-wide issues can be identified and appropriate consideration be given to where their resolution fits among the many competing priorities of the institution. Hence, these annual reports are primarily aimed at the strategic leadership of DND and the CAF, although we trust that leaders at all levels will find them of use.

The 2012 report provides a "health check" on the state of safety and risk management in ammunition and explosives-related activities of DND and the CAF for the past calendar year, an overview of the main activities of the regulator's office, and a forecast of planned activity for the next two years (2013-2014). Where appropriate, it provides more specific detail and analysis of particular issues requiring senior leadership attention.

Structure Of The Report

Following this introduction, the report provides overviews on the following:

- Compliance - This section provides an overview of compliance activities for 2012 plus relevant follow-up reporting on progress of action plans to correct issues identified in previous years. Planned compliance activities for 2013 and 2014 are also noted;

- Policy - This part documents the progress made in updating DND/CAF ammunition and explosives policy direction. A look ahead to planned work for 2013 and 2014 is also included;

- Ammunition and Explosives Safety - This provides data and analysis on reported ammunition and explosives accidents and incidents in 2012, with comparisons to past years. Ongoing efforts to strengthen the DND/CAF Ammunition and Explosives Safety Program are also discussed; and

- Assessment and Summary - Finally, we present an overall assessment of the state of safety and risk management around activities involving ammunition and explosives in DND and the CAF, and offer a summary of the main themes and issues we would invite senior leadership to take away from the report when considering priorities for focus and investment over the coming months and years.

A Leopard tank from the Lord Strathcona's Horse (Royal Canadian) Regiment fires a round during Exercise Maple Resolve in Wainwright, Alberta on October 19, 2012

Section 2

Ammunition and Explosives Compliance Framework

Background

The 2012 Ammunition and Explosives (A&E) compliance program was based on the 2012 annual compliance activity coordination letter[1]. The primary areas of interest were as follows:

- Monitoring and reporting on the results of the A&E Safety Surveys and A&E Safety Inspections, and any trends identified therein;
- Monitoring Avalanche Control (AVCON) activities, in particular the implementation of the new MOU between Parks Canada Agency (PCA) and DND, safe A&E storage and transport, environmentally approved disposal of excess gun propellant, and management of unexploded ordnance (UXO).
- Monitoring the timely review and re-licensing of DND facilities whose licenses expired during 2012;
- A review of the reports of the condition of A&E returned from Op ATHENA and a review of the combined lessons learned from Ops ATHENA and MOBILE specific to safety and management;

1 11300-1 (DAER 4. RDIMS OTT_LSTL #28160711) 10 May 2012

- A review of inventory control and management in support of operations. Specific areas of focus were: the planning for migration from the legacy CFSS to DRMIS as the future inventory system of record; continued interim use of the Ammunition Inventory Management System (AIMS) as the current technical system of record; and investigation of systemic problems in the timely submission of inventory adjustment transactions;

- Supporting work between the L1s and ADM(IE) on the development of a national A&E infrastructure Master Real Property Development Plan;

- Supporting development of appropriate procedures to enable transportation of A&E into the US utilizing commercial transportation; and

- Supporting work to establish a demilitarization capability to enable timely disposal of deteriorated and obsolete A&E and ensure compliance with Controlled Technologies regulations and UN weapons conventions.

Some of the Modular Practice Bombs BDU-5002/B involved in a few accidents on RCAF Training Ranges that resulted in a number of individuals suffering from a variety of ailments as a result of a change in the smoke formulation used in the new C12 Impact Markers.

A&E Compliance Activities In 2012

Ammunition and Explosives Safety Inspections and Surveys

The Ammunition & Explosives Safety Program includes a framework of safety surveys and inspections conducted by L1 Ammunition Technical Authorities for their respective commanders, under the technical oversight of DAER. During 2012, 28 Ammunition and Explosives Safety Inspections were completed with an average score of 88%, a high score of 100% and a low score of 71%. Table 1 provides a listing by L1 of the number of facilities required to be inspected and the number of inspections completed within the year. In some cases a physical inspection was not required because of very strong results from previous inspections, and in these instances the facility is assumed inspected this year for purposes of data tracking.

LEVEL 1 AUTHORITY	L1 AESIS REQUIRED	L1 AESIS PERFORMED
Vice Chief of Defence Staff (VCDS)	1	1
ADM Science and Technology (ADM (S&T))	2	2
Military Personnel Command (MILPERSCOM)	1	0
Canadian Army (CA)	10	10
Canadian Joint Operations Command (CJOC)	4	4
Canadian Special Operation Forces Command (CANSOFCOM)	1	1
Royal Canadian Air Force (RCAF)	9	9
Royal Canadian Navy (RCN)	2	1
Total	30	28

Table 1 - L1 AESI Results

Note: Due to extenuating circumstances, the RCN only inspected MARLANT during 2012, however by the release date of this report all RCN fleets/bases will have been inspected. The results will be commented on in the 2013 annual report.

Table 2 provides a snapshot of overall Ammunition and Explosives Safety Program health for major L1 organizations. It represents a rollup of survey scores by base to produce the colour coded rating shown. The table provides a high-level indicator of safety compliance for each L1, and also allows trends to be identified when compared to previous years. More specifically it shows:

- Strong results for ADM(S&T), CA, and CJOC;

- Some weakness in the administration element in CANSOFCOM, however a corrective plan is being implemented to address the issues identified; and

- Some weakness in three elements in the RCAF, however corrective actions are being taken and the overall score has improved from the last calendar year by approximately 3%.

The 2012 inspection program identified two common deficiencies across all commands, which are the subject of follow-up action by responsible authorities:

- Lack of timely compliance with prescribed inventory management procedures; and

- Lack of monitoring of Dummy and Display Register items.

DAER staff accompanied L1 authorities during the inspections of 4 Wing Cold Lake and CFB Wainwright. Direct feedback from Base A&E specialists and commanders indicates that the inspection process and scoring method is generally appreciated as it allowed units to focus their efforts on the most critical issues and objectively measure improvement.

L1	ELEMENT						
	SAFETY PROGRAM	STORAGE	MAINTENANCE OPERATIONS	TRANSPORT	DISPOSAL	EMERGENCY PREPAREDNESS	ADMINISTRATION
ADM(S&T)							
CA							
CJOC							
CANSOFCOM							
RCAF							
RCN							

Legend	
GREEN	Score of 60 % or more for the survey element
YELLOW	Score between 20% and 60% for the survey element
RED	Score below 20% for the survey element

Table 2 - Major L1 Ammunition & Explosives Safety Program health by survey element

Avalanche Control (Op PALACI)

In 2012, the MOU between DND and Parks Canada Agency (PCA) was renewed[2]. The regulatory framework governing ammunition transportation, storage and use under the MOU is complex as it bridges the legal boundary between Natural Resources Canada (NRCan)'s responsibilities under the Explosives Act and DND's separate authorities. The principle issues currently being addressed are:

- Due to limited space available at the Rogers Pass Hermit Site in BC, the main explosives storage magazine supporting Op PALACI is located at a limited distance from the Trans Canada Highway that reduces the amount of A&E that can be safely stored. DAER and NRCan's Chief Inspector of Explosives agreed that to ensure public safety the storage limit should be reduced from a previous limit of 5000kg to 3000kg. The new limit was written into the new MOU signed in October 2012, and NRCan has modified the PCA storage license accordingly; and

- It was assessed that this reduction in the number of artillery rounds stored at the Hermit Site would not significantly affect normal AVCON operations but could require resupply by DND during seasons of exceptional activity. Consequently, PCA is examining options for increasing storage capacity and, given its expertise in military ammunition storage, DAER is supporting NRCan in its review of a proposal to construct an additional magazine. The CJOC L1 Ammunition Technical Authority will visit the operation on behalf of DAER during the active season in 2013, to confirm the safety of the operation and make recommendations concerning the suitability of the proposed new storage site.

Storage Registers and Licences

Explosives facility licenses require renewal every five years in order to ensure that they accurately reflect conditions on the ground, which can evolve, and incorporate any regulatory changes that may have been introduced as a result of ongoing research and analysis. 353 licenses and waivers are currently in effect across DND and the CAF. Of these, 52 licences required renewal in 2012 and all were completed on time. A total of 102 will require renewal in 2013, as noted in Table 3.

COMMAND	BASE/WING/ ESTABLISHMENT	NUMBER OF LICENSES
CJOC	CFAD Angus	38
	CFAD Rocky Point	25
	CFAD Bedford	19
RCN	CFB Halifax	1
C Army	CFB Valcartier	6
	CFB Gagetown	9
	CFB Wainwright	1
ADM(S&T)	DRDC (Suffield)	2
RCAF	17 Wing Winnipeg	1

Table 3 - Licensing Requirements by Command for 2013

A&E Management and Safety in Deployed Operations

The mission transition in Afghanistan resulted in 63 containers of A&E being repatriated to Canadian Forces Ammunition Depot (CFAD) Dundurn for inspection and refurbishment. These A&E assets represented a value of $25.7M, of which $264.5K worth was condemned following inspection.

A positive outcome from this repatriation was confirmation of the very high quality of most of the ammunition deployed to Op ATHENA, much of it from Canadian Munitions Supply Program suppliers. Typically, ammunition stored in the facilities and conditions found in Kandahar would be expected to exhibit significant chemical and other deterioration resulting from

2 Memorandum of Understanding between the Department of National Defence and Parks Canada Agency Concerning the Control of Avalanches by Artillery Fire at Glacier National Park/Rogers Pass, British Columbia, signed 26 Oct 12. CJOC is OPI.

extreme thermal cycles and other effects. In this case, most of it was found to be still in very good condition and we should expect a fairly normal service life from it.

Less positively, two important observations emerged from the return of Op ATHENA ammunition stocks, which are the subject of active follow-up by relevant authorities:

- In some cases the A&E was returned in a condition that should have precluded it from being shipped, such as missing safety devices, and without required packaging. This represented a significant safety risk to the personnel, aircraft, vessels, vehicles and facilities involved in its movement and handling; and

- There were numerous discrepancies between the quantities and lot numbers of A&E physically returned, and data entered in AIMS.

These problems occurred despite the fact that very detailed direction had been provided in the MID requiring that all A&E be inspected prior to return; that any unserviceable items be destroyed in theatre by the MTTF personnel; and that all appropriate CFSS accounting actions be carried out prior to return of serviceable A&E to Canada. Post deployment reports indicate that the MTTF could not fully comply with the direction in the MID due to a shortage of qualified A&E personnel, and because of the extent of non-compliance by the units of the final Roto with MID direction concerning the proper return of A&E to the NSE. Changes to transportation plans that reduced resources used to return A&E represented a further complication.

Two lessons should be taken away from this experience:

- It is not sufficient to simply provide detailed direction for these kinds of complex and potentially hazardous operations. Adequate resources and effective on-site compliance mechanisms need to be selectively provided for higher-risk activities to cater for the inevitable human failures that are to be expected in the circumstances; and

- One year on, work continues to finalize write-off actions for A&E records which could not be reconciled during mission transition for Op ATHENA as well as OP MOBILE. This is indicative of poor accounting practices throughout the lifetime of the Afghanistan mission as well as the lack of a coordinated logistics plan for Op MOBILE. For future missions, it will be important to ensure an effective A&E accounting regime is established from the outset and adhered to throughout the mission.

Inventory Control and Management

Wider issues with A&E inventory control and management continue to pose problems at all levels of the A&E support system, including both deployed and domestic operations. Problems consistently observed include:

- A&E held by units on Supply Customer Accounts that is consumed in use but not removed from the account records through the appropriate adjustment transactions;

- Documents produced in support of annual A&E stocktaking write-offs at second line facilities not being authorized by the appropriate authorities;

- Stocktaking deficiencies involving items containing controlled technologies not being reported to the CTAT office and appropriate investigations not being carried out, as required by the CF Supply Manual; and,

- Inventory management, particularly in deployed accounts, too frequently exhibiting poor supply discipline as evidenced by the zeroing of unit accounts through the use of improper "strike-off" transactions instead of having accounts properly cleared and any shortages reported.

The consequences of these poor practices include bad inventory data reliability affecting inventory management and replenishment planning, operational planning and support, and financial reporting among other things. Failure to respect controlled technologies requirements, if not corrected, introduces the risk that Canada will begin to lose ready access to essential US or other foreign technical data and equipment.

In response to these issues, a number of offices including RCAF A4 Log staff and C Army G4 have become involved in A&E compliance inspections during 2012 and some progress is being made in correcting improper practices. DAER will continue to bring inventory management issues identified in the course of its compliance monitoring to the attention of the appropriate chains of command and Functional Authorities.

Transportation

Last year's report identified issues related to the requirement for an "EX Number" when transporting A&E into and through the USA by commercial means. A collaborative effort between DTn, CJOC J4 Ammunition, DAEME and stakeholders has resulted in the production of a document providing appropriate guidance and direction to resolve the problem.

A&E Infrastructure

Progress in this area has been slow due to the continuing absence of an acknowledged departmental authority responsible for developing a strategic A&E storage plan. This will be corrected in 2013.

Demilitarization

The department continues to accumulate significant quantities of munitions scrap from ranges and ammunition requiring disposal due to obsolescence, deterioration with age or other reasons. All of this material must be demilitarized in a way that: guarantees the complete elimination of energetic materials before it is processed for scrap or other purposes; renders it into a condition that precludes its being mistaken for potentially live ordnance in the future; and deals properly with any Controlled Technologies.

Quite apart from the cost of warehousing this material, long-term storage of it incurs modest but unnecessary risks resulting from its deteriorating condition. These risks are currently being contained and well managed by the Department, but at a continuing cost in surveillance of the condition of the stocks. This ongoing surveillance is necessary to avoid an increase in the potential for a significant event.

For at least a decade the department has struggled to establish an effective solution to its demilitarization requirement. Current efforts are directed towards establishing a contracted solution combined with a certain level of continued in-house demilitarization. The contracted solution is expected to be in place some time in 2013 or 2014.

Operation Rolling Thunder II/2012 at CFAD DUNDURN destroyed over 20 tonnes of A&E. Additionally 7 CFSD Edmonton demilitarized 21 tonnes of inert A&E items.

Despite these successes, the total inventory of material requiring demilitarization continues to grow and currently stands at 5,381tonnes. This is the equivalent of approximately 20 medium to large sized storage magazines. This growth trend will not be reversed until a viable higher-volume demilitarization capability is established.

Compliance Issue Updates From Previous Reports

Human Resources Renewal

As reported last year, RMC and the Canadian Forces Logistics Training Centre (CFLTC) are cooperating in the delivery of a new Canadian Ammunition Technical Officer (ATO) course. Serial 001, consisting of 12 candidates, successfully completed the academic phase and is now at CFLTC in Borden conducting the technical phase. This serial will graduate in the summer of 2013. Screening of candidates for Serial 002 has been completed and 13 students will commence training in September 2013. Subsequent courses are expected to provide a steady-state output of about 8 officers a year. This influx of trained officers will significantly

Consequences of Poor Risk Management

Zygi, Cyprus. 11 July 2011

In 2009, 98 sea containers were seized from a Syria-bound ship thought to be breaking UN sanctions against Iran. They were stacked at an open air site on the Evangelos Florakis Naval Base, adjacent to the main power plant for the island. The site selection was driven by security considerations as sabotage was feared. Although the cargo was known to be mostly propellant and other energetic materials, no attempt was made to follow accepted explosives storage principles despite national experts having advised authorities up to and including the President of the risks.

Offers from several Western nations to remove or help dispose of the material were declined out of concern for a possible Syrian reaction. Instead, the government tried to have the UN take the material off its hands, without success.

On 4 July 2011 it was observed that one of the containers had ruptured from a minor spontaneous explosion and fire. In the early morning of 11 July fire was observed in the stacked containers. Two hours into the firefighting effort there was a sudden mass explosion involving all 98 containers, which left a crater 60 metres wide and 11 metres deep.

Results:

- Thirteen killed, including the Commanders of the Navy and of the Base, and 62 injured

- Power plant severely damaged, knocking out about half the country's generating capacity. Rolling blackouts subsequently imposed for an extended period while capacity was rebuilt

- Significant damage to homes and businesses within a 2+ km radius, with damage reported up to 11 km away. 150 people displaced as a result

The picture shows part of the power plant that suffered over 700 million Euros in damage as a result of the explosion

- Defence Minister, Foreign Minister and Commander-in-Chief of the National Guard forced to resign.

- Prosecutions of several people, including the Defence Minister and Foreign Minister. (Attorney General declined to prosecute the President despite recommendations from investigators)

- Demonstrations in the capital against government incompetence

- Economic impact estimated by the EU at about 10% of the nation's economy. Loss of the power plant contributed to pushing the country into recession

What went wrong:

Technical:

- Ammunition was stored en masse and not separated to minimize risk of propagation between containers. No attempt to apply normal quantity-distance rules

- Ammunition was exposed to the environment for over 2 years; in particular direct solar radiation and significant thermal cycling

- Technical surveillance was inadequate. Despite intentions to do so, samples taken were not analysed for stabiliser depletion, which would have provided warning of accelerating chemical decomposition

Problem management:

- Responsibilities, accountabilities and authorities for dealing with the overall problem were not clearly defined

- Technical advice from national experts was ignored

No plan established to deal with the material, either ultimate disposal or interim management

Decisions made with no understanding of technical risks. Only political, diplomatic and physical security risks were considered

Different authorities looked at the situation through different lenses with no one putting together an integrated picture

Lessons:

It is important that there be clear and unified accountability for examining safety issues and managing risk when dealing with ammunition and explosives. In the absence of a comprehensive and disciplined approach, circumstances may arise where some risks are not recognized or ignored, or where multiple seemingly minor and disconnected risks will combine to create significant aggregate risk of a major event. This is a recurring issue in defence ammunition supply chains around the world and advanced countries are not immune from the phenomenon. The US, UK and Canada have all had such events over the years.

Sources: Munitions Safety Information Analysis Centre and Wikipedia

reduce the current shortage of ATOs and improve institutional capacity to deliver the ammunition program, and effectively manage its risks. It should also enable better career development of all ATO-qualified junior officers by allowing improved balance between employment in ammunition and primary specialty positions, over time strengthening capacity to provide strong institutional leadership for the program.

Within the RCAF a significant program is underway to realign the structure of the aircraft maintenance technician occupations to better meet future requirements. An important part of this realignment is the re-establishment of the Air Weapons Systems (AWS) Technician occupation. The process is being well managed, with legacy competencies resident in the Aviation Systems occupation being leveraged as the AWS Technician occupation grows to its planned size. The target end-state is expected to be reached in 2019.

The Masters-level Explosives Engineering program at RMC continues to provide the required numbers of qualified ammunition engineers needed to support program requirements in the areas of Safety & Suitability for Service assurance and design management. However, work remains to be done to strengthen training and professional development for other communities of practice within the ammunition program, in particular military and civilian Ammunition Technicians.

Sergeant Carl Labrecque and Master-Corporal J.P.R. Tremblay conduct forensic procedures on a pressure plate used by insurgents in Afghanistan to detonate Improvised Explosive Devices

Establishment of L1 Ammunition Technical Authority (ATA) Offices

L1 commanders and managers with A&E under their control are progressively establishing ATA offices consistent with individual organizational circumstances and need. These positions are intended to:

- On behalf of the commander or manager, develop and manage an Ammunition and Explosives Safety Program designed for the specific circumstances of that organization;
- Facilitate consultation and cooperation between the L1 organization, the ammunition program, and DAER as the DND/CAF Regulator. This includes advocating on behalf of the L1 organization to ensure that program activities and regulations respect their needs; and
- Provide the commander or manager with timely and accurate advice on ammunition and explosives matters[3].

Continuing shortages of ATO and Ammunition Engineer officers have made it difficult to staff these offices with appropriately qualified and experienced personnel, so a number of compromise solutions have had to be adopted as interim measures. With the expanded ATO training pipeline now in place, this problem will be corrected over time. Table 4 summarizes the status as of 31 December 2012.

Clearance of Active Ranges

ADM(IE) is the DND/CAF Functional Authority for clearance of active ranges. DAER provides regulatory guidance and direction. DAER conducted its first compliance inspection of a contracted UXO clearance activity on an active training area in 2012 at CFB Shilo. Base staff and contractors worked together to excavate, Level 3 screen, and recover to CFAD Dundurn for demilitarization 171 tonnes of munitions scrap. A total of 179 items found were confirmed as live and disposed of through detonation.

The compliance inspection team made minor observations with regards to outdated references in the contracting documents but these did not affect the safety of the work. The observations are being addressed by ADM (IE) through amendments to the Range Clearance and UXO Clearance Handbook. Overall, the operation was assessed as "Good" and the Base Commander and his staff are commended for their effective management of the initiative, and through it for having taken positive steps to deal with the UXO situation in the training area. The result is a safer work and training environment for all users.

3 C-09-005-001/TS-00 Program Management and Life Cycle Safety Section 2 Individual Terms of Reference

L1 ORG	POSITION	FILLED OR VACANT	QUALIFIED ATO OR AE	COMMENT
RCN	DGNP/DMPOR/ATO	Filled	Y	
C Army	DGLS/COS Land Ops/DLSS/G4 Ammunition	Filled	Y	
RCAF	1 CAD HQ/A4 Maint ARM	Filled	Y	
CJOC	CJOC Sp/CMSG/J4 Ammunition	Filled	Y	Also supports ADM(S&T) and VCDS Gp,
CANSOFCOM	CANSOFCOM HQ/J4 Ammunition	Filled	Y	
ADM(Mat)	DGLEPM/DAEME 6	Filled	Y	
ADM(IE)	DGRP/DRPP 5	Vacant	N/A	Solution still being negotiated
VCDS Gp	COS VCDS/GMS/RM-6 (VCDS Gp GSO)	Filled	N	Backup support provided by CFSU(O) Ammunition Tech Sgt or CJOC ATA.
CMP	Asst CMP/D Mil Pers Staff/Safety Officer (CMP GSO)	Filled	N	Backup support provided by CFLTC
ADM(S&T)	DGRDCS/DRDIE 2 (ADM(S&T) GSO)	Vacant	N/A	Supported by CJOC ATA.

Table 4 - Status of L1 ATAs

DND UXO and Legacy Sites Program

ADM(IE) is also the manager of this program. DAER accompanied the UXO and Legacy Sites Program Explosives Safety Risk Assessment Officer on his compliance verification of the Churchill, Manitoba legacy site cleanup. The overall verification went very well and confirmed that the UXO and Legacy Sites Program has instituted an excellent compliance program for contracted work.

This is important as under forthcoming amendments to the Explosives Act the MND's accountability for self-regulation will unambiguously extend to all contractors providing UXO services under a DND contract. Consequently, the department must ensure that an effective, auditable safety compliance program is in place and consistently applied in its contracts with civilian UXO operators. The amended Operational Training Part 3-Range and Unexploded Explosives Ordnance Clearance Handbook details the required procedures for utilizing contracted UXO firms.

Underwater UXO

National implementation of the recently published CSA Standard Z275.6 Underwater UXO Diver has been problematic because the civilian institution intended to provide the required training program is not doing so. Also, it has been found that the qualification requirements for key positions prescribed in the standard resulted in very few individuals being able to conduct the work. The standard is now under review by CSA to address these issues and DAER has reverted to earlier contractor qualification requirements for UXO divers pending the promulgation of a revised standard.

UXO Summary

Overall, considerable UXO clearance work was completed across the country in 2012. Continued active oversight and compliance verification of this activity is required to ensure that Explosives Safety standards are respected throughout the process. Annex D details the Legacy sites, their current Risk Assessment Levels, and work conducted on them over the past year.

Safety and Suitability for Service

DAEME continues to improve the Safety and Suitability for Service (S3) process in response to the 2009 DAER S3 Compliance activity. Of the 32 observations made in 2009, DAEME has resolved 21 and only 11 remain. The following actions were progressed or completed in 2012:

- Work continued on the revision of D-09-002-010/SG-000, Assessment of the Safety and Suitability for Service of Ammunitions and Explosives. It is expected to be completed by late 2013;
- A Qualified Ammunition Technical Authority (QATA) pilot course was run in February 2012. Attendees provided a considerable number of comments and the course will be revised and improved before a second serial is conducted in 2013;
- An outreach program has been established to assist Project Directors and Project Managers in understanding and complying with ammunition-related requirements of the Project Approval Directive; and,
- DAEME has created a Lessons Learned database which is updated on a regular basis.

DAEME is implementing its new ISS standard commencing with the CASW project, the first to produce the ISS required documentation (ISS Program Plan and ISS Item Test Plan).

DAER Engineering Studies

DAER continues to sponsor a limited number of low-cost, high potential return engineering studies that fall outside the bounds of ADM(S&T)'s thrusts and DAEME LCMM studies. They deal with particular A&E safety concerns and the results are shared as appropriate with ADM(S&T), DAEME and international partners. The studies have continued this year with the first empirical data expected in the next calendar year. The following are in progress:

- Hazard Division 1.3 Locker Trial. Evaluate and compare standard storage lockers' structural integrity and level of protection when subjected to thermal flux and overpressures, and determine the flame pathways. In addition, determine the expected damage to equipment and injury to personnel in close proximity to the lockers. The data will allow development of better standards and adoption of better storage solutions for small quantities of Hazard Division 1.3 ammunition;

- Non-sparking Tools for Use in A&E Environments. To determine the criteria and evaluate the measureable standards by which tools should be assessed before they receive the designation as "Non-sparking Tools to be use in A&E Environments" (i.e. hazardous environments such as explosive dust and vapours);

- A&E Explosive Environment Survey. To determine if volatile vapours and/or airborne particulates are present and whether they reach harmful levels in A&E facilities (i.e. to collect and develop a facility survey database);

- Shaped Charge Trial. The aim of this trial is to test the viability of spherical shaped charges to blow-in-place the different calibers of Canadian ammunition and insensitive ammunition by low order detonation and by high order detonation. This would provide a simpler, faster and safer alternative to current methods. The trial was carried out in Valcartier Garrison from 3 to 12 July 2012 and from 23 July to 2 August 2012. The shaped charges were tested against a variety of different ammunition items either placed on the surface or buried in the ground. The results of the trial appear positive and are still being analysed. Initial findings have been shared with the US DoD; and

- Feasibility Study for Thermal Disposal Trial (i.e. Thermite Flares). To determine if a suitable thermal set or pyrotechnic igniter would be an acceptable method to replace the current expensive and time-consuming "counter charge" method of disposal for malfunctioning pyrotechnics, including those with thin metallic casings.

A&E Compliance Program Of Work For 2013-2014

Surveys and Inspections

DAER will continue its program of surveys and inspections in collaboration with L1 Ammunition Technical Authorities to verify the state of the DND Ammunition and Explosive Safety Program. DAER will also conduct an Explosives Safety Compliance visit to CFEOD and CJIRU to review CBRNE response SOPs, with specific focus on plans for storage of chemical, biological and radiological devices once rendered safe.

Integrity of the DND Ammunition and Explosives Safety Program

DAER will continue working with relevant L1 authorities to resolve issues related to their implementation of mandated safety measures. There are a number of specific cases of host-lodger relationships requiring clarification of accountabilities, for example LFCA Training Centre Meaford is a Canadian Army organization supported by CFB Borden, which is a MILPERSCOM unit, but also receiving investigative and inspection assistance for ammunition issues from CFAD Angus, a CJOC unit.

AVCON

DAER will conduct a Compliance Verification activity on Op PALACI activities within the next two years. This will follow up on the CJOC L1 ATA Inspection in February 2013.

Risk Management

A way ahead will be developed with CJOC and CFEOD for ensuring that DND/CAF's museums, both official and unofficial, have all explosive ordnance displays confirmed as Safe for Display in accordance with current regulations.

Summary

The general state of compliance with DND/CAF explosives safety regulations across the institution is good and, for the most part, the inherent risks are being managed appropriately. Nevertheless, concern exists over the lack of a framework for maintaining a comprehensive institution-wide view of ammunition program delivery, which not only causes inefficiencies but also makes it difficult to deal effectively and efficiently with some program risks. The decade-long search for an ammunition demilitarization solution, which is still not in place, is only one clear illustration of the cost of failing to provide good, integrated, management of the program. Very significant amounts of storage space are taken up by munitions scrap and ammunition awaiting disposal, and this material must be actively monitored to ensure that it can continue to be stored safely. These costs continue to mount.

2013 is expected to see the establishment of an improved ammunition program construct that, over time, should improve the efficiency and effectiveness of program delivery, and better

management of its risks. DAER will work closely with the new program leadership to help ensure success.

2013 should also see slow but steady progress in HR renewal for the specialist communities that deliver much of the ammunition program. The successful completion of the first Canadian ATO course in 2013 and reinvigoration of the Air Weapons System Technician are important steps in this process.

Conversely, there remain two areas requiring immediate focus by the ammunition program leadership and the wider institution. These are: resolution of the continuing widespread deficiencies in ammunition inventory management and control practices; and institutionalizing permanent fixes for the problems identified in ammunition management within deployed operations. If not properly resolved, these latter issues have significant potential to lead to major consequences in future missions.

Search and Rescue technician, Master Corporal Bruno Robitaille, from 424 Transport and Rescue Squadron in Trenton, Ontario uses a C8 smoke grenade to signal an aircraft to his location for a mountain rescue scenario during the National Search and Rescue Exercise (SAREX) 2012 near Val-d'Or, Quebec.

Members of the Royal Canadian Navy fire a Bofors 40mm gun during the final stages of their gunnery course at Boffin range at Canadian Forces Base (CFB) Valcartier, Quebec on 2 October, 2012.

Section 3

Ammunition and Explosives Policy Framework

Background

Orders and directives covering Ammunition and Explosives policies, procedures and regulatory processes are essential for the safe conduct of operations, both domestic and deployed. The objective is to minimize non-battle casualties, losses and damage in operations, and at home to avoid casualties, damage and other losses to valuable human and materiel resources. In achieving this objective, there is a secondary benefit in preserving public confidence in National Defence's stewardship of these resources.

The publications and instructions issued are designed to provide L1 organizations with comprehensive source documents on all aspects of the ammunition and explosives life cycle, from cradle to grave. Development of policy is achieved through a collaborative process involving stakeholders and taking into account international initiatives to foster interoperability, identify best practices, and ensure common compliance with accepted standards.

The work on A&E policy documents during 2012 continued to close policy gaps and improve the currency of safety regulatory publications. The main thrust was to complete the drafting and consultation on the key volumes and to provide interim policy in support of operations.

A&E Policy Activities For 2012

DAODs

DAOD 3002-0 - Ammunition and Explosives. CAF organizational changes have delayed staffing of the update to this document in order to allow amendments to be made to ensure that it accurately reflects the authorities, accountability and responsibilities for ammunition and explosive safety at all levels.

DAOD 3002-5 – Use of Firearms, Ammunition and Explosives. Work continued on this document to address concerns by L1 organisations that the scope impinged on areas outside of the DAER mandate. Final consultation with key stakeholders has been completed and the revised document is being staffed through the publication process.

DAOD 3002-7 – Ammunition and Explosives Risk Management for the DND and the CAF. Drafting of this document is complete. It is being staffed for publication.

C-09-005 Series

C-09-005-001/TS-000. Volume 1 – Program Management and Life Cycle Safety. This publication has been translated and formatted. Technical accuracy check of the document is in progress, and publication is anticipated in 2013.

C-09-005-002/TS-000 Volume 2 – Storage and Facility Operations. The technical accuracy check of Volume 2 was completed in 2012 and the second revision was completed. The Volume is now undergoing final editing; the publication of the Volume is expected in 2013.

C-09-005-003/TS-000 Volume 3 - Transportation. External consultation for Change 1 was completed. The changes include insertion of the detail from A&EI 29, Packaging and Return of Surplus Gun Propellant Increments into a new Section 4 of the manual. In addition, some minor changes to information regarding the transportation of Munitions Scrap and updates to contracted UXO policy guidance were inserted. A&EI 29 will be cancelled upon publishing of this manual expected in 2013.

C-09-005-004/TS-000 Volume 4 - Demilitarization and Disposal. This is a new publication which encompasses the content from the old C-09-008-001/FP-000 - Destruction of Surplus Obsolete and Deteriorated Ammunition and C-09-008-003/FP-000 - Stray Ammunition publications. This entirely new publication was released for internal and external stakeholder review in December 2012.

C-09-005-005/TS-000 Volume 5 – Deployed Operations. Much work was done in 2012 on NATO's equivalent publication Allied Ammunition Storage and Transportation Publication (AASTP-5) leveraging Canada's Lead Nation experience in Kandahar. This volume was published in October (Edition 1 Version 2) and the draft of Canada's Volume 5 incorporates this latest information. Volume 5 will be published in 2013 after having undergone stakeholder review.

C-09-008-002/FP-000 Ammunition and Explosives Procedural Manual Destruction of Dud and Misfired Ammunition on CAF Ranges and Training Areas. This publication was completed and is awaiting publication. A PDF of the final version has been posted on the DAER intranet site.

C-09-008-003/FP-000 Disposal of Stray Ammunition. All detail from this publication has been incorporated into C-09-005-004/TS-000 Volume 4 - Demilitarization and Disposal which is undergoing external review. Once the new Volume 4 has been published this document will be cancelled.

Ammunition and Explosives Instructions

A&EI 11 Change 2 - Disposal of Ammunition and Explosives at the End of Life Cycle. Changes to the A&EI are being completed to ensure that the most recent direction with regards to Munitions Scrap is included. It is intended that this A&EI will be cancelled on publication of C-09-005-004/TS-000, Volume 4 - Demilitarization and Disposal, which is expected in 2013.

A&EI 33 - CFTO on the LUU-2D/B was released on behalf of DAEME.

A&EI 34 - Approved Misfire Procedures for Electrically Initiated Disposal Operations was published.

A&EI 36 - Labels Applicable to the Certification of Ammunition and Explosives was finalised in November 2012. The A&EI will be released once the contract for the labels has been fulfilled and the labels delivered to the CFSDs. That is expected in early 2013.

A&EI 38 - Fresh water launch procedures for the MLM C2A2 was published.

A&EI 39 – Miniature Magazine Concrete Earth-Covered Three-Bay was released in 2012. This A&EI approved for use a three-bay earth covered miniature magazine that, if the Net Explosives Quantity limits are respected, is sited on blast only. The benefit of this magazine is that it requires a smaller quantity distance footprint which would resolve storage issues experienced by some of the smaller second line ammunition facilities and certain operational units in meeting the required overriding minimum distances to protect from fragmentation and debris.

Risk Management

As reported last year, the required keystone policy for managing risk throughout the entire A&E life cycle has been written and will be contained in C-09-005-001/TS-000 Volume 1 – Life Cycle Safety and the specific application of it for deployed operations will be contained in C-09-005-005/TS-000, Volume 5 – Deployed Operations. The related DAOD 3002-7, which will provide authorities for A&E risk management, is being staffed for approval.

Environmental Policy

Munitions Analytical Compliance Suite (MACS). The planned acquisition of MACS through FMS was cancelled as a result

of contracting difficulties between the MACS software owner and the U.S Army Defence Ammunition Centre (USDAC). Alternatives such as the Norwegian AMIN system have been considered however none have yet been identified that would meet the DND/CAF need for an analytical database. Follow-on discussions with USDAC are continuing.

CF EOD Issues

Home Made Explosives (HME) has been an active topic this year. A joint DAER/Canadian Army CANFORGEN was issued to remind all personnel of the requirement for a waiver to conduct any HME training. We continued to work closely with NRCan to make sure that DND regulations are in lockstep with National rules and regulations for conducting HME training on or off DND property.

International Policy

In the continuing effort to improve safety on operations, DAER worked extensively with the international community to further develop guidelines and standards. Canada's experience as lead nation in Kandahar demonstrated the need for commonly agreed ammunition storage rules and standards in multinational operations and NATO has sought to profit from the lessons learned and the collaborative solutions developed for ammunition storage in KAF. DAER has worked closely with the US Department of Defense Explosives Safety Board (DDESB) on US-led initiatives to amend NATO doctrine under the banner of Explosives Safety Munitions Risk Management (ESMRM) and played a leadership role in the Allied Logistics Publication (ALP) Development Panel and the associated ESMRM Doctrine Ad Hoc Working Group, under the supervision of NATO AC/326, the CNAD Ammunition Safety Group (CASG). By amended existing - and publishing new - doctrine for A&E safety, combined and joint operations will more properly consider A&E risk. As a follow-on, work continues to provide similar input to CAF joint doctrine, with a view to ensuring that Canada can seamlessly interoperate with NATO allies and partners.

International partnerships in safety guidelines continue to be enhanced through membership and strong participation in the thirteen-Nation Munitions Safety Information Analysis Centre (MSIAC).

DAER continues to maintain a close working relationship with the United Nations Office of Disarmament Affairs (UNODA) and their rapidly expanding program concerned with implementing their International Ammunition Technical Guidelines (IATG). A review of the IATG is being coordinated by NATO CASG and is on-going. This will ensure that guidelines used by NATO and the UN are synchronized.

A&E Policy Program Of Work For 2013-2014

DAODs

DAOD 3002-0 - Ammunition and Explosives. It is anticipated that this revised DAOD will be promulgated in 2013.

DAOD 3002-5 – Use of Firearms, Ammunition and Explosives. It is anticipated this revised DAOD will be promulgated in 2013.

DAOD 3002-7 – Ammunition and Explosives Risk Management for DND and the CAF will be promulgated in 2013 or early 2014.

C-09-005 Series

C-09-005-001/TS-000. Volume 1 – Program Management and Life Cycle Safety. Publication is anticipated in 2013.

C-09-005-002/TS-000 Volume 2 – Storage and Facility Operations. Publication of the Volume is expected in 2013 in conjunction with Volume 1.

C-09-005-004/TS-000. Volume 4 - Demilitarization and Disposal. It is anticipated that this publication will be sent for formatting and translation services in May of 2013. Final publishing date is expected late 2013 depending upon publishing backlog. Once published the following A&EIs and pubs will be superseded:

- A&EI 08 - Plastic Coated Tape Explosives Safety Hazard - Electrostatic Discharge;
- A&EI 09 - Crimping of Non Electric Blasting Caps - Procedures and Protective Equipment;
- A&EI 11 - Disposal of Ammunition and Explosives at the End of Life Cycle;
- A&EI 14 - Mitigation of Blast and Fragmentation Effects Utilizing Sandbags;
- A&EI 31 - Destruction by Open Burning of Surplus Propellant on Approved Burning Trays;
- A&EI 34 - Approved Misfire Procedure for Electrically Initiated Disposal Operations; and
- C-09-008-001/FP-000, Destruction of Surplus Obsolete and Deteriorated Ammunition.

Ammunition and Explosives Instructions

Barricade Construction. Policy on the height, length and location of barricades will be revised. The height of barricades between magazines will no longer be based on the 2 degree rule but rather will be a fixed height over the ammunition stack. This change will eliminate excessively high barricades while still providing the necessary protection to prevent propagation from high velocity low angle fragmentation.

Pre-Engineered Magazines. An A&EI on the installation of pre-engineered magazines will be issued in 2013. Authorization has already been issued to units to acquire magazines either meeting the Natural Resources Canada Storage Standards for Industrial Explosives – Type 4 magazine design or the US Naval Facilities Engineering Service Center Technical Data Sheet TDS-2078-9 Pre-Engineered Explosives magazine design. The use of pre-engineered magazines is a cost effective alternative to normal construction.

New Policy Direction

Work is progressing to update the electrical standards required for explosive magazines. Discussions with DCAE/Electrical have achieved a certain level of understanding, but further work is required. The objective is to avoid unnecessary costs incurred in holding to outdated historical standards. Once agreed, appropriate guidance will be incorporated into the new Explosive Safety Manual, Volume 8 (Construction Standards).

Summary

Anticipated publication dates for several key policy document were not met during 2012. This was primarily due to timelines for centralized translation and formatting being far in excess of predictions. Additionally, the requirement to conduct technical accuracy checks of translated documents continues to be a challenge.

Delays in publication of key DAODs on the Ammunition Program Governance and Risk Management have also had an impact on the publication of the first 2 volumes of the new series. Interim policy has been developed which will provide the appropriate guidance until such time as the DAODs are promulgated.

Significant progress was made in the development of other publications with the cooperation of key stakeholders. In particular the incorporation of 2 C-09-008 series documents into the new Volume 4 - Demilitarization and Disposal will eliminate duplication of information and provide a single source for users.

Cooperation with international partners continues to provide significant benefit to DND and the CAF in ammunition and explosives regulatory matters. We continue to benefit from access to an extensive body of standards, test data and international best practices through the NATO CASG, MSIAC and key bilateral relationships. At the same time Canada has had good success in having a number of its policies and principles incorporated into NATO publications, which are widely used beyond NATO nations, simplifying our efforts to ensure interoperability. DAER will continue to leverage these international connections for DND/CAF benefit going forward, remaining mindful of the need to contain the associated costs

The work program for 2013/2014 is once again ambitious with several key documents planned for publication.

Soldiers from the 2nd Battalion, The Royal New Brunswick Regiment, fire a Carl Gustav 84 mm during Exercise Maritime Raider 12 at Fort Pickett, Virginia, in March 2012.

Section 4

Ammunition and Explosives Safety Advocacy and Analysis

Introduction

Strengthening of DND/CAF ammunition and explosives safety advocacy and analysis capabilities continued in 2012. Principal activities included: analysis of accident and incident reports, including statistical analysis; development of a new Explosives Safety Program policy manual; supporting the preparation of a Business Requirements Document for a new e-solution for safety management; and development of new Unit Ammunition Representative and Unit Explosives Safety Officer courses with the CF Logistics Training Centre (CFLTC). Assistance was also provided to a number of compliance activities.

A&E Safety Advocacy And Analysis Program - Details Of Major Activities In 2012

Policy

A-GG-040-006/AG-001 DND/CF Explosives Safety Program. This is the main policy manual for the Ammunition and Explosives Safety Program. It was last updated in 1994 and is now undergoing modernization. The new policy will incorporate the CSA Z1000-06 Occupational Health and Safety Management standard, which was published in 2006. Among other things, this standard will ensure that the "Duties of Employers" in the Canada

Labour Code are properly reflected in the policy. The rewrite is therefore substantial and involves extensive consultation with stakeholders. We are now aiming for publication in 2013.

Following promulgation of the new policy, L1 organizations will be asked to revise their respective Ammunition and Explosives Safety Programs, and reasonable time will be allowed to accomplish this. The end result is intended to be that the programs in DND and the CAF will fully meet all legal requirements and be comparable to any modern Health and Safety Management System in industry or government.

Development of Courses

Unit Ammunition Representative (UAR) Course. Financial difficulties prevented CFLTC from advancing the development of the Distance Learning (DL) version of the course in 2012. Classroom training continued throughout 2012, with 14 serials completed, two of which were conducted in LFWA. A total of 251 personnel were qualified in 2012. Nonetheless, training throughput still falls short of the DND/CAF annual requirement, estimated to be 400. Figure 1 shows the number of UAR courses and graduates since 2006.

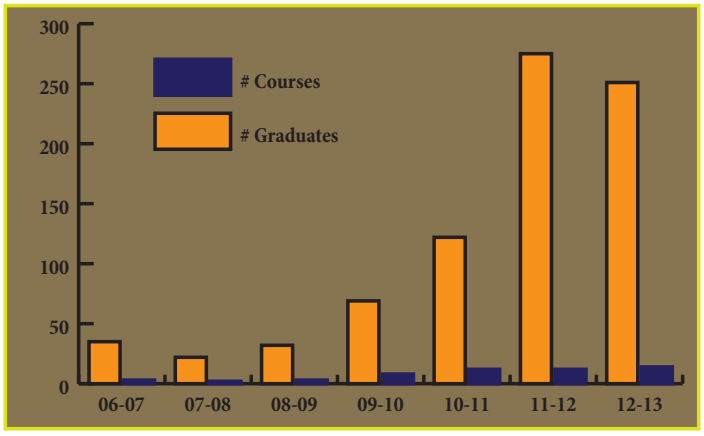


Figure 1 - Number of UAR Courses and Graduates

Unit Explosives Safety Officer (UESO) Course. The UESO Course is designed to teach personnel appointed as unit explosives safety officers how to design, set up and run a unit program. Unfortunately, it has never been delivered due to the non-availability of the necessary resources. The course was included in the same DL development program as the UAR Course and thus development was also suspended in 2012. The Master Lesson Plan Board has been completed, along with the story boards for the DL solution. It is ready for finalization and implementation whenever the required resources can be made available.

Observation. The completion and implementation of the two DL packages would cost under $200K. This amount would be fully recovered within one year in savings from the current in-house delivery of the UAR Course alone. At the same time, the DL solutions would permit current deficiencies in the throughput of the UAR Course to be more easily filled, and fill the total gap in UESO training. DAER is working with CFLTC and CFSTG to find the means to have these solutions completed and implemented as soon as possible.

Educational and Awareness Promotion Products

Posters. Two posters were published in 2012, and they can be seen at Figure 2:

- The first one relates to potential occurrences in laboratories or workshops; and
- The second poster updates an older one that had been removed from issue due to significant translation errors. It was produced at minimal cost within DAER, using photographs provided by CFAD Angus.

DVD. A third DVD was not pursued in 2012.

Awareness Promotion Items. Due to the fiscal environment within the department, no promotional items were ordered in 2012.

Figure 2 New Posters Issued in 2012

Communications

General. Theme 7 of the CRS 2005 evaluation of the DND/CF Ammunition Safety Program was Communications[1]. One of the recommendations was to "…establish mechanisms to promote dialogue and information sharing across DND/CF ammunition safety community and with key external organizations". The following paragraphs summarize the latest efforts to continue enhancing communications for the ammunition program at large, and the issues faced by the community.

Impact of Controlled Goods Regulations on Dissemination of Information. The application of Controlled Goods (CG) Regulations has made gaining access to technical publications more difficult and a more lengthy process. DAER, which used to provide direct links to all publications, is now able to provide direct access to only the technical publications that it controls, and will continue to do so as these are not controlled documents under the Regulations. In order to resolve CG information access issues for UAR Course candidates, the curriculum was modified to remove the requirement for course candidates to be CG certified. However, the wider issue of practitioner access to technical documentation remains. Interim solutions currently in place are inefficient from a business operations perspective and may discourage some people from making the effort to ensure that they have all the current information needed to complete a task properly and safely. Vigilance is therefore needed on the part of supervisors and managers overseeing ammunition-related activities involving CG to ensure that all the information needed to understand and minimize risk is obtained.

DAER DIN Site. The DAER DIN page continues to be managed as a reference site for the ammunition community. In 2012 the range of educational topics covered as Vignettes was expanded. Considerable effort is required to keep Vignettes up-to-date and relevant, but this effort will continue to be expended in order to provide support to unit level safety education.

DAER Shared Workspace. The Shared Workspace of DAER provides the ability to create virtual working groups with key stakeholders to support consultations on the revision of existing manuals or the development of new policy. It has also been used in the production and review of training packages. Overall usage increased markedly in 2012, with the creation of Navy, terminology, and storage workspaces.

Ammunition and Explosives Safety Conference. The sixth Conference took place in November at the Nortel Campus in Ottawa. A total of 152 individuals registered for either all or part of the three-day event, which provides a venue for practitioners across the institution to learn about new and ongoing developments, provide feedback on issues of concern at the operational and tactical levels, and engage in vertical and horizontal consultations on issues of importance. These conferences continue to be assessed by participants as providing very valuable return to the many organizations they represent and are intended to continue.

Electronic Tools

Safety Information Management System. In 2011 the first five requirements of the Ammunition and Explosives Safety Information Management System were selected for development by IM Group. It will develop these requirements along with those of the Flight Safety Program for an upgraded Flight Safety Occurrence Management System, with a view to providing a common corporate solution called the Safety Information Management System (SIMS). The intent is for relevant functionality in this solution, once implemented for the two lead sponsors, to then be extended to the other DND/CAF safety programs. The Business Process Mapping and Business Requirements Document have been completed, and development was approved and started in the summer of 2012. The five requirements being developed for the explosives safety program are:

- Occurrence Reporting;
- Defects and Malfunctions Reporting;

1 1258-101-2 (CRS) Evaluation of DND/CF Ammunition Safety Program, February 2005

- Ammunition and Explosives Safety Inspections and Surveys;
- Ammunition and Explosives Licensing and Storage, including waivers; and
- Risk Management.

While this does not resolve all issues related to the electronic tools required to provide timely information to decision makers, it represents a major step in the right direction. It is expected that initial capability will be delivered in 2014.

Defence Resource Management Information System. The Department is proceeding with the migration of ammunition inventory accounting into DRMIS as part of the Supply Chain Integration initiative under the MASIS Project. Unfortunately, the solution being delivered lacks some functionality needed for effective corporate management of ammunition (similar deficiencies exist in the legacy CFSS platform) and so a follow-on effort is being pursued through the MA&S Stream II initiative, led by DGMSSC, to fill in the gaps.

DAER will continue to support work to provide an effective enterprise-wide business environment for the management of ammunition and explosives by ensuring appropriate alignment between the DND/CAF rules, regulations and policies it manages and the DRMIS solution, as well as by providing technical advice as needed. Further, it will continue to assist as needed in the management of legacy applications such as AIMS until they are able to be shut down with the progressive delivery of improved DRMIS functionality

Summary Of 2012 Accident And Incident Analysis

Statistics

A detailed analysis for 2012 is attached as Annex C. Along with the analysis is a narrative summary of accidents and incidents, which is intended to promote dialogue down to the unit level and to encourage and support local safety lectures and other discussions about ammunition and explosives safety.

Figure 3 and Figure 4 provide a trend analysis for reported occurrences (accidents and incidents) and deaths and injuries during the past ten years. The dotted line indicates the creation of DAER, when a major process change for the reporting of A&E occurrences was introduced.

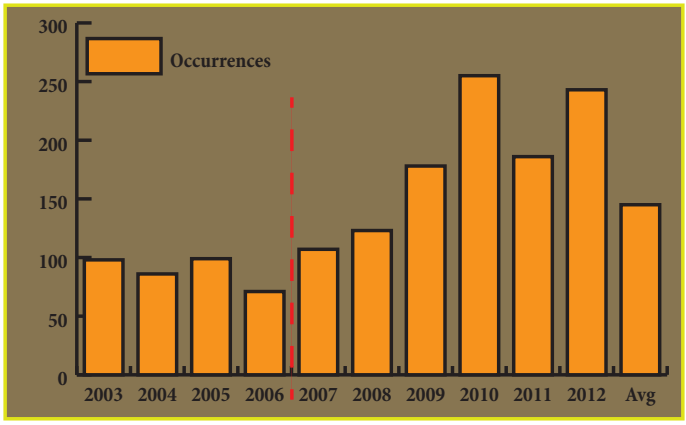


Figure 3 Reported Occurrences 2003-2012

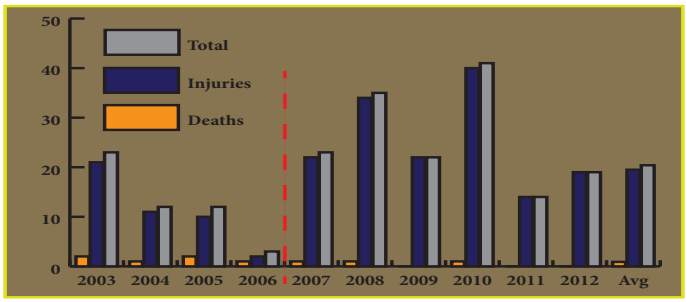
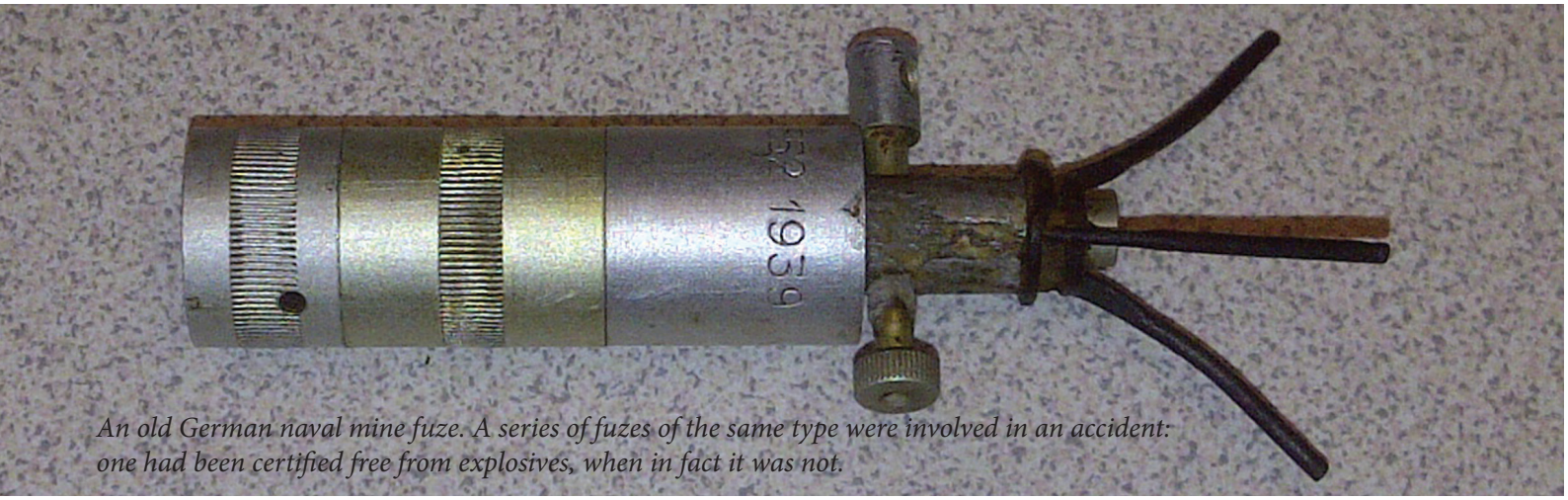


Figure 4 Reported Deaths and Injuries 2003-2012

Analysis

Based on the historical averages and the detailed analysis at Annex C, the following points are worthy of note:

- In the vast majority of reported cases, the ammunition or explosives worked as designed. There was one injury



An old German naval mine fuze. A series of fuzes of the same type were involved in an accident: one had been certified free from explosives, when in fact it was not.

in 2012 attributable to an ammunition fault: during firing a parachute flare handle separated from the launch tube, causing minor injury to one member;

- Common User natures – those most frequently used and most familiar to CAF personnel – continue to be involved in a high percentage of incidents and accidents, with 33 occurrences involving small arms ammunition, 9 involving grenades and 29 others involving pyrotechnics;

- Most events are the result of human error (80% - which is consistent with 2011 and up slightly from previous years); and

- Deliberate deviations from authorized procedures caused 12 % of occurrences, including six accidents, fortunately none with injuries. Although difficult to accurately quantify in aggregate, damage from deliberate deviations was substantial in 2012. For example, a single event - a forest fire caused by inappropriate techniques and failure to respect the fire threat level - resulted in $595K being charged to the RCAF base concerned by the Department of Natural Resources of the province. In addition, $44.5K in additional costs were incurred by the supporting Army area, $16K was billed by the contractor managing support services on the base, and $1.2K was paid by DND for repairs to a cemetery. Hence the direct costs of the incident totalled $656.7K[2]. Of further note, 75%, or 22 of the 29 reported deviations from procedures, occurred within Canadian Army (CA) units. This is roughly proportional to the Army's consumption of ammunition compared to the rest of the CAF and is therefore not indicative of a particular problem in the CA. It nevertheless does represent an area of opportunity for further analysis of underlying causes and action to address factors that cause or contribute to these costly events.

Observations

Accident and Incident Reporting. Reporting of accidents and incidents continues to be an area of major weakness in many areas of the institution. Reporting is important to both policy makers and commanders at all levels because good data is essential to support good policy development and effective performance management. Accidents and near-accidents are frequently indicators of either local or systemic problems (or both) in how activities are supervised and the associated risks managed. However, if the true scope, scale and nature of such problems remain invisible it is difficult to identify and prioritize appropriate solutions.

The issue of inadequate reporting is complex and has existed for many years. There are no simple solutions and in 2013 DAER will initiate more detailed study with a view to engaging key organizations in a fact-based discussion on how to address it going forward.

2 Costs obtained from the base concerned, and are valid as of 30 January 2013.

Display Ammunition. In 2012 there were two incidents and one accident involving Display ammunition. The incidents involved ammunition received by a museum without proper free-from-explosives certification. The accident involved an item that had been wrongly certified for use in a unit display. There have been similar occurrences over the past three years. Closer monitoring of compliance with free-from-explosives certification and verification standards by units and museums will be included in DAER's 2013 compliance program.

Summary Of 2012 Accidental Discharges

Statistics

This is the second year accidental discharges are reported separately from other incidents following the promulgation of new direction in 2010. The decision to report accidental discharges separately was made in order to avoid skewing the data, when comparing incidents from year to year.

In 2012, DAER received a total of 70 Accidental Small Arm Weapon Discharge Reports. They were broken down as follows:

- Pistols: 20 occurrences, or 28.57 %;

- Rifles/Carbines: 36 occurrences, or 51.42%; and

- Machine Guns: 14 occurrences, or 20%.

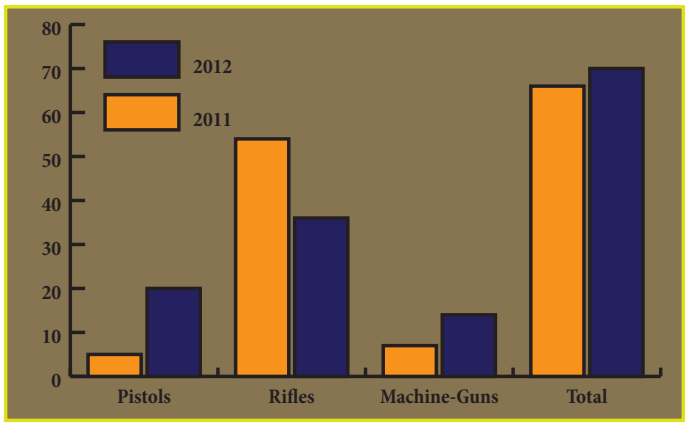


Figure 5 Comparison of First Two Years of Reporting

It must be noted that the accident and incident reporting problems discussed above also affect accidental discharges. The issue here, though, may be more related to confusion or excessive complexity in the relevant policies and processes. During the past year, hundreds of CAF members were convicted under the military justice system for negligent discharges, indicating there is often discipline around, and local reporting of, such incidents. However, the data has not found its way into the mandated corporate reporting process, undermining efforts to track, analyze and identify any systemic causes, contributing factors or potential corrective measures. DAER will include discussion of accidental discharge reporting in its consultations with stakeholders on the wider problem of reporting.

Analysis

Although limited reporting poses a challenge for carrying out a full analysis, some conclusions can be drawn:

- Close to 50% of accidental discharges in 2012 related to pistols and machine guns, a significant increase compared to the previous year. Whether this represents an aberration or a trend will not become apparent for another year or two;
- Twenty-seven out of the 70 reports came from Afghanistan, which indicates that there has been generally good reporting from units in theatre;
- Among major users of ammunition, CTC Gagetown and LFCA Training Centre Meaford were the only CA units to file reports (12 and 16 respectively). No MILPERSCOM units reported; and
- The causes of the 70 reported incidents can be divided into 2 groups: human error and weapon malfunction. In 98% of reported cases, discharges were the result of human error.

Observation

The major observation resulting from reviewing the various reports is that in the majority of cases of accidental discharge, weapon handling drills were not properly followed. However, considering there were 34,449,125[3] rounds of small arms ammunition of all types fired by tens of thousands of CAF Members, visiting forces, cadets, police officers and civilians in 2012 on Canadian ranges and training areas, plus an unknown number of rounds fired in theatres of operations and on foreign ranges, the very small numbers of reported cases and service tribunal convictions suggest that weapons handling training is probably generally effective. The absence of better quality data, however, makes it impossible to confirm this or to identify any localized areas of weakness

Recommendations

Efforts should be made to strengthen reporting of accidental discharges to support improved analysis and trend identification. Trend data is valuable for, among other things, identifying areas of weakness in weapons training delivery, providing indicators of the impact of changes in training practices and the introduction of new training technologies. It would also be useful when introducing new weapons to be able to accurately compare the incidence of accidental discharges through the introductory period, and between the new weapon and the old one. It can also provide an early indicator of a need to consider design modifications.

3 Number extracted from the Canadian Forces Range Information System on 8 March 2013

A&E Safety Advocacy And Analysis Program Of Work For 2013-2014

Policy

A-GG-040-006/AG-001 DND/CAF Ammunition and Explosives Safety Program. Consultations with Level 1 ATAs on the content and structure of the update to this instruction is continuing. The objective is to complete work on it in 2013.

A-GG-040-006/AG-002 DND/CAF Ammunition and Explosives Accident / Incident / Defect / Malfunction Reporting. As a result of the Ammunition and Explosives Safety Program policy manual rewrite, a revision of the reporting manual will be initiated to maintain alignment between the two and improve data quality, with a view to strengthening the ability of commanders and staffs to observe trends and identify root causes.

DAODs 3002-3 and 3002-4. Following the revision of the reporting manual, both DAODs related to the Ammunition and Explosives Safety Program will be revisited and rewritten to conform to the new DAOD writing guidelines. Work on these will likely extend into 2014.

Development of Courses

DAER 3 will continue to work with CFLTC to implement the DL UAR and UESO courses with a view to improving the ability of CAF units to meet their requirements for this training and reducing training delivery costs. The objective is to implement these solutions in late 2013, if financing can be secured.

Educational and Promotional Products

Posters. DAER has established a limited, low-cost, in-house capability to design and distribute safety posters. It is a secondary function for one person and pursued only as primary duties permit. Poster development will continue as a limited effort in 2013 with the intent of producing up to 2-3 a year going forward.

Awareness Promotion Items. DAER will very selectively pursue the procurement and distribution of awareness promotion items where they are shown to be effective.

Communication

Controlled Goods. DAER will continue to work with the various responsible authorities to find appropriate means to ensure that adequate access to technical data is provided to practitioners when required, while respecting CG Regulations.

E-Business Environment. Evolutionary expansion of the use of e-business tools will continue in 2013. The DAER DIN site is now mature and the focus will be on managing content and encouraging its wider use. The shared workspace is also well established and receiving increased usage by the practitioner communities. Expansion into secure internal systems and the non-secure external (i.e. internet) environment will be explored based on the assessed need.

Annual Conference. The intent is to continue organizing one major conference per year for ammunition practitioner communities.

Enterprise Solutions

DAER will be active in supporting development of two corporate systems in 2013 and 2014:

- SIMS. The bulk of the work in 2013 and 2014 will concentrate on the development of the various modules of SIMS. The first module, on occurrence reporting (including defects and malfunctions), is scheduled for delivery in the spring of 2014. Other modules will follow, but delivery dates have not been identified yet; and

- DRMIS. Further development of the other requirements identified in the Ammunition and Explosives Safety Information Management System requirement will be taken forward for consideration for inclusion in the MA&S Stream II initiative for DRMIS, with the aim of eventually having all relevant ammunition management functions done within the system. A review of the various Business Functions which are related to ammunition will occur, and Business Process Modeling in relation to Supply procedures will take place during 2013 and early in 2014.

Summary

Sustained efforts made over the past several years to put in place key enablers in order to strengthen explosives safety programs and practices are now culminating. While much more remains to be done, the fruits of this work will start to be harvested in the coming year or two. These include:

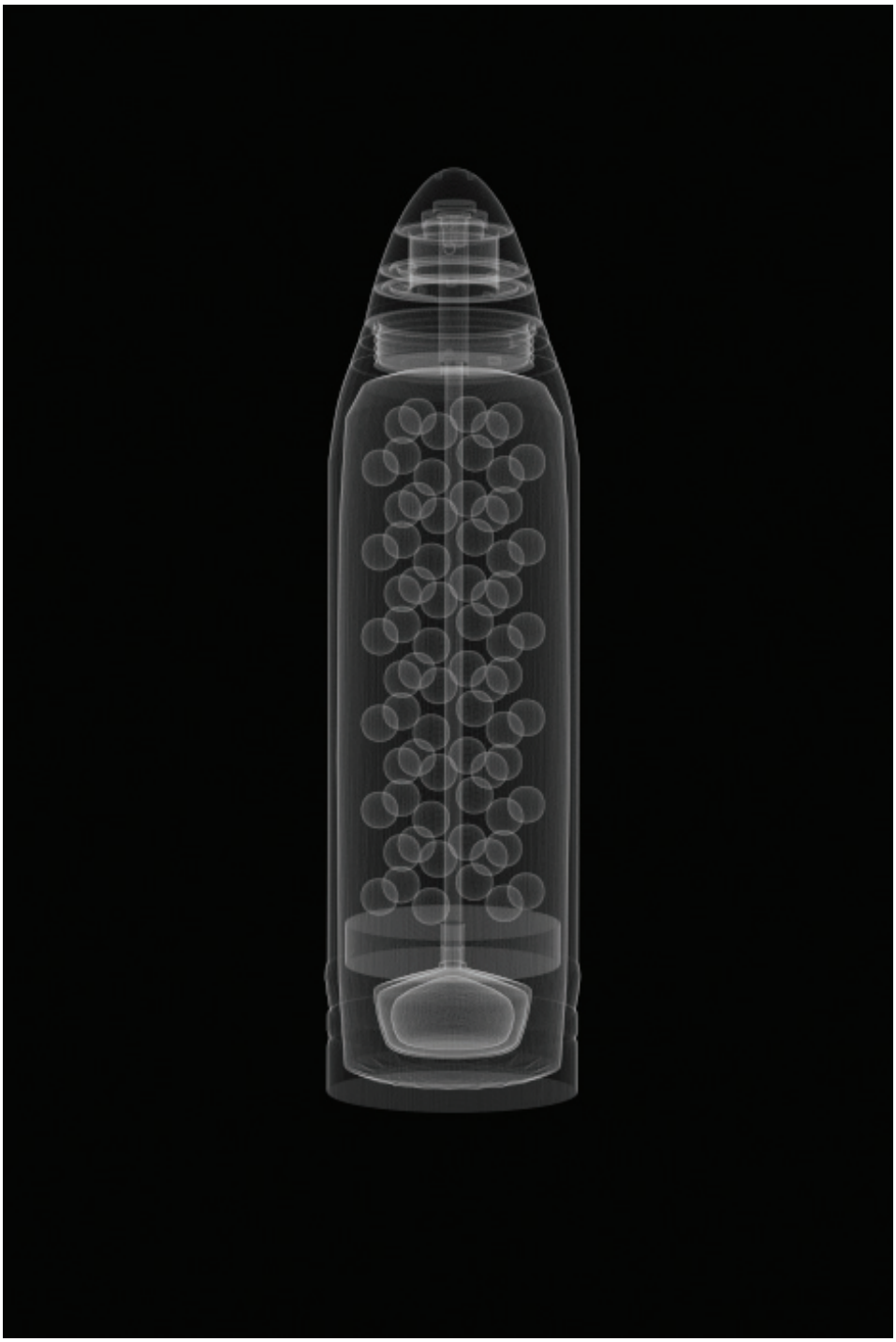
- Modernized safety policies and program guidance, firmly based on national and international standards and best practices, that provide the chain of command with more effective safety and risk management tools;

- A consistent and sustained effort to collect and analyze data concerning ammunition and explosives occurrences is starting to indicate which areas need to be worked on in order to improve on safety and strengthen risk management practices;

- Delivery of two new DL training courses (subject to funding) that will eliminate training bottlenecks, enable commanders down to unit and sub-unit level to establish stronger local safety programs and risk management practices, and provide major time and cost savings in training delivery; and

- Delivery of new business solutions, notably DRMIS and SIMS, will soon provide more sophisticated and powerful management and analytical tools.

Our near-term major focus remains getting the new enablers delivered and improving the way we inform and support the institution in delivering ammunition and explosives safety programs, and in managing related risks. However, at the same time we are continuing to work with the relevant communities of practice and the chain of command to identify requirements for, and plan the delivery of, future policy, program and system improvements.



X-Ray view of an 18 Pdr created using the NGRAIN Producer software, used by the Canadian Forces Logistics Training Centre to train Ammunition Technicians and Ammunition Technical Officers

Tactical Vest damaged by an L83 smoke grenade that was initiated as a result of the fly up lever getting caught in its surroundings

Section 5
Conclusion

Overall Assessment And Conclusion

In order to provide senior management with an overall assessment of the state of explosives safety compliance and risk management in DND and the CAF, a summary view was introduced in the 2010 annual report, modified from selected key elements of the Treasury Board Management Accountability Framework (MAF). This view has been found to have been useful and is now a permanent feature of these reports. It provides a high-level perspective of the current strengths and weaknesses of the DND/CAF ammunition program from a regulatory and safety perspective.

The following 5 MAF assessment areas were originally selected for reporting on A&E safety management. The MAF has since evolved, and the areas have been tailored to fit within the context of reporting on the performance of the ammunition program. They therefore don't necessarily closely align with the current MAF, however we have retained the same areas in order to maintain consistency year over year. Minor text editing has been done this year to improve clarity:

Assessment Area	Decription
Governance and Strategic Direction	Internal coherence, corporate discipline, and alignment of processes and activities to outcomes are in place and enable the provision of sound strategic direction and support to users and the ammunition program
Policy and Programs	Development of policy and program tools are sustained in order to provide appropriate advice and guidance to L1s
People	DND/CAF has the required A&E specialists, work environment and focus on building capacity and leadership for the future.
Risk Management	Risk Management activities in the A&E life cycle are governed by an overarching policy, risk decisions are taken at the appropriate level and mitigation measures are tracked.
Stewardship	Departmental Control Regime (assets, money, people, and services) is integrated and effective. Underlying principles are clear and contribute to the accomplishment of an effective A&E regulatory regime

Each area was then rated against a MAF-derived assessment scale, predominantly based on qualitative measures based on observations in the annual reports as described below:

Rating	Description
Attention Required	Significant deficiencies – inadequate attention being paid
Opportunity for Improvement	Moderate deficiencies – evidence of attention to the deficiencies and progress
Acceptable	No significant deficiencies – meets the requirements of the DND/CAF A&E regulatory framework
Strong	No deficiencies in any of the measures – exceeds the minimum requirements of the DND/CAF A&E regulatory framework.

A plane crash site near Churchill, Manitoba, where the UXO and Legacy Sites Program conducted a clearance operation in the summer of 2012

Assessment Element #1 - Governance And Strategic Direction

Overall Rating:	"Opportunity for Improvement"

This element considers how well the ammunition program and associated activities are managed. Sound governance and strategic planning enables leadership to effectively allocate resources to priorities, align activities to outcomes and manage program risks. Indicators of sound governance and strategic direction include:

- Governance. Program responsibilities and accountabilities are well defined and program leadership makes informed, proactive and timely decisions to achieve desired results.
- Planning and Plans. Program planning is comprehensive and aligned with corporate priorities, business plans and resource allocations.
- Program Coordination. There is good policy coherence and effective coordination of program activities to support efficient and effective delivery of required outcomes.

No substantive progress was made in 2012 in clarifying and strengthening the governance and strategic direction of the ammunition program, although considerable foundational work was done to more fully understand and document the deficiencies, and develop solutions. This should enable the department to take positive steps in 2013. The current status of action in response to recommendations related to this assessment element from this and previous annual reports is noted in the table below.

REQUIRED ACTION	ANNUAL REPORT	STATUS	COMMENTS
Establish effective strategic-level executive leadership of the ammunition program.	2012, 2011, 2010.		The DCOS(Mat)-led study of the ammunition program was expanded to a full program analysis following the initial report. Final decisions on program structure and design now expected in 2013. Implementation to follow.
Review of DAOD 3002-0 Functional Authorities	2012, 2011, 2010.		A critical policy update has been held up by delays in approving revision of DAOD 1000-0. The timeline for issuing the new DAOD 1000-0 is unknown.
Accountabilities of the Ammunition Board	2012, 2011, 2010.		Being addressed in the ammunition program study

Assessment Element #2 – Policy And Programs

Overall Rating:	"Acceptable"

Although very good progress continued to be made in the renewal of the ammunition and explosives policy suite, delays in the approval of critical DAODs have begun to affect implementation of key policy changes. Also, delivery of two widely needed distance learning training solutions that would significantly reduce costs and deliver much better results for the institution was suspended in 2012 for lack of funding. The current status of action in response to recommendations related to this assessment element from previous annual reports is noted in the table below.

REQUIRED ACTION	ANNUAL REPORT	STATUS	COMMENTS
Restructure of policy framework into new series of A&E manuals	2012, 2011, 2010, 2009, 2008.		DAER policy update program of work is on track for completion by 2014. Delay in departmental approvals of key DAODs is introducing new schedule risk.
Implementation of new program tools	2012, 2011, 2010.		The AESS/AESI Evaluation process has done well in its first year. Only finalization of MOUs/SLAs between L1s to address issues of efficiency remains to be completed.
Implementation of improvements for safety & suitability for service assessments	2012, 2011, 2010, 2009.		The Corrective Action Plan stands at 21 of 32 observations rectified. Given that the timeline for correction of the remainder has expired, DAEME is revisiting this to update the remaining 11 items' resolution.
Review of doctrine for logistics disposal of A&E in theatre	2012, 2011.		381(1) and the Demilitarization and Disposal Manual have been updated to clarify MilE versus AT/ATO responsibilities. All definitions have been entered into the DTB in 2012. This item is closed.
Implementation of new in-service surveillance program (ISSP)	2012, 2011.		Implementation continues.
Assignment of EX Numbers for A&E transportation to US	2011.		A complete process has been implemented by J4 Tn and has been successfully employed throughout 2012. This item is closed.
Development of Unit Ammo Rep and Unit Explosives Safety Officer DL courses	2012, 2011, 2010, 2009, 2008.		All action was suspended in 2012 for lack of funding to complete work. More expensive classroom training for UAR Course continuing but not meeting demand. Funding secured to complete work in 2013.
Further development of Ammunition & Explosives Safety Information Management System (AESIMS)	2012, 2011, 2010, 2009, 2008.		Corporate SIMS development in progress to meet consolidated needs of multiple safety programs. On track to deliver initial capability in 2014.
Improve reporting of A&E occurrences	2012, 2011.		Weakness in reporting is a long-standing and complex problem that defies simple solutions. DAER has initiated work on a strategy to address it and will be engaging relevant L1 organizations in its development through 2013.

Assessment Element #3 – People

Overall Rating:	"Acceptable"

This element considers the state of the small but highly specialized workforce required to deliver the ammunition program. Effective management of this workforce requires a long-term strategy and sustained effort. Indicators of sound workforce management include:

- Selection and Training. There is sustained planning for ensuring that adequate numbers of specialist military and civilian practitioners are recruited, trained and retained to meet program needs. Training is delivered as efficiently as possible.

- Leadership Development. There is a coherent approach to the development of leadership competencies for specialist practitioners, including future institutional leaders.

Although this element still has a number of issues needing to be addressed, a very significant forward step was taken in 2012 with the start of training for Serial 001 of the Canadian ATO Course. Where previously ATO generation was largely limited to the small numbers of places Canada could obtain on the UK course, we can now scale production to actual requirements and, more importantly, take a new strategic approach to the management of officers in this specialty. Over the long term, this will have a major positive impact on the management of the ammunition program and related activities across the department and CAF. However, this outcome will only be realized if necessary work is done to improve career and professional development planning for these and other ammunition practitioner communities, and the capacity to do this has not yet been established. The requirement has been identified in the ongoing ammunition program study.

The current status of action in response to recommendations related to this assessment element from the current and previous annual reports is noted in the table below.

REQUIRED ACTION	ANNUAL REPORT	STATUS	COMMENTS
Transition of the Ammo Engr PG program from SLA to full funding	2011, 2010.		Funding confirmed. Completed.
Stabilize the Ammunition Technician Trade	2012, 2011, 2010.		The trade is considered Green by CMP because overall numbers are good. However, there remain significant issues of rank distribution, with shortages at key senior levels. An Occupational Analysis is currently being conducted which will likely lead to trade structure changes.
Re-introduction of the Air Weapons System Technician in the RCAF	2012, 2011, 2010.		The second course has been successfully concluded. The RCAF forecasts that it has sufficient AVN technicians qualified in air weapons handling to meet all operational and training needs as the AWS technician trade is brought up to strength.
Development of civilian ammunition practitioners under the civilian ammunition technician program	2012, 2011, 2010, 2009.		Program continues on track. CAT 4 Lesson Plans under development.
Provision of L1 Ammunition Technical Authority (ATA) Support	2012, 2011.		Further improvement has been seen but several L1 ATA positions continue to be filled by unqualified personnel. J4 Ammo continues to support three additional L1s due to this situation and the lack of additional ATOs and Ammunition Engineers with the requisite experience to fill these positions.
Implementation of ATO training in Canada	2012, 2011, 2010.		Serial 001 will graduate up to 12 officers spring 2013. Serial 002 with 13 officers will start fall 2013. Program to reach steady-state production of 8 per year in 2014.

Assessment Element #4 – Risk Management

Overall Rating:	"Opportunity for Improvement"

This element considers the effectiveness of integrated risk management in program delivery and more widely in activities involving ammunition and explosives. A proactive, rather than reactive, approach to managing risk provides for better decision-making and timelier responses to emerging risks that threaten the operational capabilities of the CAF and safety of personnel. Indicators of sound risk management include:

- Program Risk Management. Within the program delivery framework there is sound risk management methodology, effective governance and clear leadership accountability for integrated risk management.

- Corporate Risk Management. More widely in DND and the CAF, there is clear and coherent strategic direction concerning the safe custody, handling and use of ammunition and explosives. Commanders and managers at all levels have ready access to technical advice relevant to the activities they conduct involving ammunition and explosives. There is ongoing corporate monitoring and reporting on compliance with relevant policies, procedures and norms at all levels, with effective mechanisms for managing risk and quickly identifying and correcting problems.

Although the overall rating of this element remains "Opportunity for Improvement" the corporate risk management component is assessed as being "Acceptable". Adequate corporate direction is in place concerning the safe custody, handling and use of ammunition and explosives, and it is being progressively updated and improved. Ammunition Technical Authorities have been designated as technical advisors by the major L1 organizations that make extensive use of ammunition and explosives, and major users at all levels have generally good access to qualified advisors. There remain gaps for minor users however these are being progressively addressed. Major L1 users are collaborating well with DAER in the conduct of active compliance activities. There remains a gap in certain parts of the institution when it comes to reporting of accidents and incidents and DAER will be working with the organizations concerned to determine causes and find appropriate solutions.

Program risk management is rated as "Opportunity for Improvement" because of continuing major gaps in its integrated management, making it impossible to undertake effective integrated risk management. The requirement has been identified in the ongoing ammunition program study.

The current status of action in response to recommendations related to this assessment element from the current and previous annual reports is noted in the table below.

REQUIRED ACTION	ANNUAL REPORT	STATUS	COMMENTS
Devolution of approval authorities for higher risk activities to the appropriate level	2012, 2011, 2010.		Legal endorsement obtained. New DAOD being staffed for approval.
MOU on avalanche control with Parks Canada – safety and regulatory requirements.	2012, 2011, 2010.		New regulatory framework in place between DND and NR Can. Compliance verification required and planned in collaboration with NR Can and CJOC. Issues with conditions of storage identified and being discussed with Parks Canada.
Continued progress in addressing legacy sites	2012, 2011.		Progress continues to be made but reductions in funding by 40% are expected to impact the Program. Anticipate a slow down in 2013.
Improve control over display ammunition	2012.		Problems identified in 2012 with energetic component clearance verifications of display ammunition items in some locations will be followed up with the responsible L1 authorities in 2013.
Improve control over higher risk A&E support activities in deployed operations	2012.		Significant issues identified in the operation to close Op ATHENA and return ammunition to Canada need to be addressed for future missions. DAER will support and monitor the resolution of this problem by the responsible authorities.

Assessment Element #5 – Stewardship Of Assets

Overall Rating:	"Opportunity for Improvement"

This element considers how well ammunition and explosives-related assets, including infrastructure, lands, inventories and equipment, are managed. Indicators of sound stewardship of assets include:

- Real Property. A real property management framework ensures that investments are planned and real property is managed in a sustainable and financially responsible manner, throughout its life cycle, and support cost-effective and efficient delivery of the ammunition program.

- Ranges and Training Areas. Effective plans and programs are in place to ensure the long-term environmental protection and sustainability of ranges and training areas where ammunition and explosives are used. Legacy sites with known or suspected contamination are properly managed and progressively cleaned up. New technologies that reduce the environmental impact of using ammunition and explosives are introduced where feasible and affordable.

- Materiel. A materiel management framework ensures that ammunition and explosives are managed throughout their life cycles in a manner that is sustainable and financially responsible. Ammunition and explosives are safely stored and protected in a manner that preserves public safety and that of CAF personnel and DND civilians. Materiel is accurately accounted for in accordance with government standards.

Although some progress has been made in discrete areas, major shortfalls persist in Real Property, in particular optimization of ammunition warehousing and distribution facilities to most efficiently support CAF training expenditures, and in accurate inventory accounting. The very considerable build-up of munitions scrap and obsolete or deteriorated ammunition is a further concern. All of these are consequences of weak or nonexistent strategic planning in the ammunition program, which should start to be addressed in 2013 as proposed improvements to the program structure and management are implemented. The current status of action in response to recommendations related to this element from the current and previous annual reports is noted in the table below.

REQUIRED ACTION	ANNUAL REPORT	STATUS	COMMENTS
Progressing the demilitarization initiative	2012, 2011, 2010, 2009.		Progress continues to be slow, however a contracted solution addressing most of the demilitarization requirement is expected to be put in place within the next two or three years.
Strengthen environmental stewardship within the A&E regulatory framework	2012, 2011, 2010.		The draft Air Emission Standard for Stack Emissions to support demilitarization has been developed by DAER in collaboration with ADM(IE), and in consultation with the various national and provincial authorities. However, resource restrictions in ADM(IE) have essentially halted the promulgation of required DND policy direction. This has considerable potential to affect contracting for demilitarization services.
Strengthen ammunition inventory control and accounting	2012, 2011, 2010.		DAER will continue to observe on this issue from an explosive safety viewpoint. Problems continue with supply discipline, including improper write-off procedures, failure to report expenditures and failure to report stocktaking deficiencies of items involving controlled technologies. The Department is establishing a strategy and program to address these issues.
Access to Technical Data	2012.		Corporate solutions for managing access to technical data for CTAT/ITAR controlled technologies are difficult to use and there is a risk that needed data may not be available when required for some A&E activities to be safely executed. Responsible supervisors at working levels need to exercise diligence in this area. DAER will continue to encourage and monitor development of improved solutions.
A&E Infrastructure Real Property Development planning	2012, 2011, 2010.		Not currently being done for A&E infrastructure. This is to be addressed through the ammunition program review.

Summary

The overall rating remains unchanged from 2011 at "Opportunity for Improvement". However, measurable progress has been made in a number of areas and good foundational work that will pay off going forward has been done. The absence to this point of coherent strategic leadership of program delivery has been a major impediment to achieving greater results. It is anticipated that improvements in program management will be introduced in 2013 which should, over time, generate stronger results.

Conclusion

While this report identifies many issues of greater or lesser concern in the conduct of defence activities involving A&E, in the context of the scale and scope of DND and CAF operations it must be said that oversight, control and risk management of these activities are currently being done adequately in most cases. That said, there continue to be worrying exceptions, particularly in deployed operations, and there are other clear indicators of structural weaknesses that have considerable potential to allow circumstances to develop over time that could cause a major event.

These issues need to be tackled strategically, and of the many identified in this report as requiring management attention, the areas we believe merit the greatest focus are:

- Improving control and management of A&E support activities in deployed operations;
- Establishment of effective strategic-level executive leadership and governance of the ammunition program;
- Strengthening ammunition inventory control and accounting, from both a systems perspective and correcting improper practices;
- Strengthening management of the specialist Communities of Practice essential to successful program delivery; and
- Completing modernization of the A&E policy suite.

Throughout 2012 the Department put considerable energy into analysis of the deficiencies in its management of the ammunition program, and developing potential solutions. This foundational work, once followed up in 2013 with decisions and action to establish effective management, should provide a significant payback going forward in terms of improved strategic coherence, more effective program delivery, overall reduction of program risk and better risk management. These outcomes should materially improve explosives safety and regulatory compliance across the institution.

DAER will continue to support the Department and CAF in their efforts to achieve these important ends by actively working with the responsible authorities and key stakeholders on the identification and implementation of good solutions, and by continuing to inform senior management about the state of compliance with A&E regulatory requirements, effectiveness of risk management, and state of A&E safety programs and practices across the institution.

A CF18 launches a flare during an exercise at Homestead, Florida, in February 2012.

Annex A

Summary of DND/CAF Ammunition and Explosives Totals by Group for Demilitarization

Introduction

The following information is applicable to all the tables in this summary:

- The information is based on CTAT's "Certificate of Demilitarization" form DND 2586 received by DAEME;
- DAER is using an average number of 400 pallets per magazine, based on the capacity of the 17m x 20m magazine used in many locations in the CAF; and
- Not all units are writing off (striking off) the inventory once destruction/disposal has occurred, some units are taking between 3-6 months to complete the write-off transaction. Data errors are therefore known to be present.

Table 1 – Ammunition And Explosives Pending Demilitarization/Destruction

Table 1 summarizes the totals of ammunition and explosives awaiting demilitarization or destruction. The data contained in the table is current as of 31 December 2012

Group	Munitions types	Current Qty	Total Wt kg	Total Wt Tonnes	Total Pallets	Total Magazines	Remarks
A	SAA up to and including 50 Cal	3,414,860	220,890	220.9	186.2	0.45	
B	20mm through 24mm	415,170	131,888	131.9	145.3	0.36	
C	25mm Through 40mm	21,777	42,866	42.9	56.1	0.14	
D	40mm Naval Through 104mm	38,987	390,777	390.8	364.9	0.91	76mm (cougar) & 2.75inch warheads
E	105mm Through 155mm	13,435	628,723	628.7	543.3	1.36	DPICM Pending Contract, 6 Letters of Interest received from 5 companies
F	AC Bombs	92	5645	5.6	20.6	0.05	
G	Propellant	22,860	29,232	29.2	19.8	0.05	
H	CADS & PADS	149,733	72,274	72.3	142.1	0.36	
I	Demolition Material	5,876	9,900	9.9	3.6	0.01	Detaprime (No Taggent)
J	Fuzes, Primers and Tracers	60,495	10,248	10.2	13.3	0.03	
K	Grenades	0	0	0.0	0.0	0.00	
L	Rocket Motors	84,542	321,612	321.6	949.2	2.37	CRV Pending Environmental Impact Assessment Approval
M	Missiles and Rockets	5,659	121,536	121.5	1,381.0	3.45	Eryx
N	All Pyro	168,876	73,334	73.3	179.9	0.45	
O	Decoy Devices	7,662	5,636	5.6	3.3	0.01	
P	Naval	3,248	6,378	6.4	3.3	0.01	
Q	Chemical - WP, RP and CS Irritant	59,770	188,276	188.3	158.8	0.40	66mm Red Phosphorus Grenades, Vehicle launched
R	Mines	0	0	0.0	0.0	0.00	
S	Munitions Scrap (Range and Disassemble) kg		3,058,022	3,058.0	2,297.9	5.75	
T	Inert Trg (Dummy and Display)	7,175	17156.62	17.2	32.4	0.08	pending mutilation
U	Aids to Production - Repack material	27,171	16,419	16.4	685.6	1.72	pending mutilation
V	Spent Brass and Steel Cartridges	22,155	29,910.50	29.9	225.0	0.56	pending mutilation
W	Salvage (links, launch Tubes)			0.0		0.15	

Table on Demilitarization 1 - Ammunition and Explosives Pending Demilitarization/Destruction

Table 2 – Ammunition And Explosives Awaiting Disposal By Sale

Table 2 summarizes the totals of ammunition and explosives awaiting disposal by sale. The data contained in the table is current as of 31 December 2012.

Group	Munitions types	Current Qty	TotalWt kg	Total Wt Tonnes	Total Pallets	Total Magazines	Remarks
A	SAA up to and including 50 Cal	0		0.0			
B	20mm through 24mm	0		0.0			
C	25mm Through 40mm	0		0.0			35mm HE & TPT Sold
D	40mm Naval Through 104mm	7,864	249, 730	249.7	384	0.96	105mm TK one buyer for C76 model
E	105mm Through 155mm	0		0.0			
F	AC Bombs	0		0.0			
G	Propellant	0		0.0			
H	CADS & PADS	0		0.0			
I	Demolition Material	0		0.0			
J	Fuzes, Primers and Tracers	0		0.0			
K	Grenades	0		0.0			
L	Rocket Motors	0		0.0			
M	Missiles and Rockets	0		0.0			
N	All Pyro	0		0.0			
O	Decoy Devices	0		0.0			
P	Naval	0		0.0			
Q	Chemical - WP, RP and CS Irritant	0		0.0			
R	Mines			0.0			
S	Munitions Scrap (Range and Dis-assemble)	0		0.0			
T	Inert Trg (Dummy and Display)	0		0.0			
U	Aids to Production - Repack material	0		0.0			
V	Spent Brass and Steel Cartridges		245,134	245.1	204	0.50	Processed Metal/ Plastic at Crown Assets Distribution Centre
W	Salvage (links, launch Tubes)	7,864		495	588	1.46	

Table on Demilitarization 2 - Ammunition and Explosives Pending Disposal by Sale

Table 3 – Disposal By Destruction

Table 3 is a summary of the disposal by demilitarization, destruction and mutilation that occurred in 2012. The data contained in the table is current as of 31 December 2012.

Energetic A&E Items Destroyed As of 31 Dec 2012						
LIVE	Number of Items	NEQ	Wt Kg	Wt In Tonnes	Pallets	Magazines
Energetics Dundurn	10,757	601.83	11,213.75	11.2	7.62	0.02
Rolling Thunder II	58,003	36,359.02	307,149.37	307.1	289.41	0.72
Energetics Angus	6,152	257.88	2,942.79	2.9	1.26	0.00
Energetics Rocky Point	139	8.68	108.38	0.1	0.21	0.00
Energetics Wainwright	3,502	69.04	322.63	0.3	1.03	0.00
Energetics Valcartier	24	17.18	320.54	0.3	0.50	0.00
Energetics Cold Lake	61,414	2,296.01	22,656.67	22.7	29.52	0.07
Energetics Bagotville	1,387	65.42	702.56	0.7	4.40	0.01
Energetics Petawawa	3,861	324.06	2,603.25	2.6	10.77	0.03
Totals	145,239	39,999.12	348,019.94	348.0	344.72	0.85
Items Mutilated and Processed as Scrap Material						
Non-Ex	Number of Items	NEQ	Wt Kg	Wt In Tonnes	Pallets	Magazines
Inert Munitions	29,286		227,820.00	227.8	348.58	0.87
Tools and equipment	66		8,184.05	8.2	26.19	0.07
Aids to Production	14,559		22,803.00	22.8	137.19	0.34
Salvage	136,298		267,005.34	267.0	464.38	1.16
Totals	180,209		525,812.39	525.8	976.34	2.44
Combined Totals	Number of Items	NEQ	Wt Kg	Wt In Tonnes	Pallets	Magazines
	325,448	39,999.12	873,832.33	873.8	1,321.06	3.30

Table on Demilitarization 3 - Ammunition and Explosives Summary, Disposal by Destruction 2012

Table 4 – Disposal By Sale

Table 4 is a summary of the disposal by sale that occurred in 2012. The data contained in the table is current as of 31 December 2012.

Grouped Munitions Types Sales Totals As of 31 Dec 2012							
Group	Munitions types	Current Qty	Total Wt kg	Total Wt Tonnes	Total Pallets	Total Magazines	Remarks
A	SAA up to and including 50 Cal	1,938,415	17,332	17.3	20	0.05	9mm Blank
B	20mm through 24mm						
C	25mm Through 40mm	6,548	7,009	7.0	9	0.02	35mm HE & TPT
D	40mm Naval Through 104mm						
E	105mm Through 155mm						
F	AC Bombs						
G	Propellant						
H	CADS & PADS						
I	Demolition Material						
J	Fuzes, Primers and Tracers						
K	Grenades						
L	Rocket Motors						
M	Missiles and Rockets	2,174	95,656	95.7	181	0.45	TOW Sold (but to be replaced with TOW Wireless)
N	All Pyro						
O	Decoy Devices						
P	Naval						
Q	Chemical - WP, RP and CS Irritant						
R	Mines						
S	Munitions Scrap (Range and Dis-assemble)			0.0			
T	Inert Trg (Dummy and Display)						
U	Aids to Production - Repack material						
V	Spent Brass and Steel Cartridges			0.0			
W	Salvage (Processed scrap, metal, brass, plastic)		167,817	167.8	302	0.76	

Table on Demilitarization 4 - Ammunition and Explosives Summary, Disposal by Sale 2012

Cpl Patrick Rabosa and Cpl Alex Hamilton of Charles Company, 1 RCR, fire 60mm illumination mortar rounds at the CFB Petawawa ranges

Lieutenant (Navy) Adam MacIntyre, a boarding party team member, conducts a small arms proficiency shoot onboard Her Majesty's Canadian Ship Charlottetown in the Gulf of Aden while on Operation ARTEMIS on June 27, 2012.

Annex B

Status of Main Policy Manuals

Publication of volumes in the new Ammunition and Explosives Safety Manual continues, although some delays have been encountered in the publication process. Some of these volumes are also dependent on the staffing of DAODs, notably 3002-7 on Risk Management, which is being staffed for approval.

During 2012, a new DAOD staffing/approval process was announced, based on procedures used elsewhere in government. One key feature of the new process is that DM and/or CDS approval is required for all DAODs. Furthermore, all extant DAODs will be reviewed for compliance with the revised formats, including the requirement for a dedicated Consequences paragraph to detail the consequences of non-compliance. The DAOD review cycle is expected to be changed from five years to three years.

Although C-09-005-002/TS-000, Ammunition and Explosives Safety Manual Volume 2, Storage and Facility Operations has been published, the over-arching risk management policy has not yet been promulgated. Therefore, although Volume 2 as published includes provisions relating to risk-based waivers, these provisions are not yet in effect. A&EI 03/07 and C-09-153-001/TS-000 therefore remain valid for waivers. This was noted in the announcement that accompanied publication of Volume 2.

Document/Subject/ Theme	Brief Description	Date Current Document Published	Comment
A&E DAODs			
3002-0	Ammunition and Explosives	Nov 2006	To be reviewed in 2013
3002-1	Certification of Ammunition and Explosives	Aug 2012	No Consequences paragraph.
3002-2	Insensitive Munitions	Aug 2012	No Consequences paragraph.

Document/Subject/ Theme	Brief Description	Date Current Document Published	Comment
3002-3	Ammunition and Explosives Safety Program	Dec 2007	To be reviewed in 2013
3002-4	Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting	Dec 2007	To be reviewed in 2013
3002-5	Use of Firearms, Ammunitions and Explosives	Dec 2007	Presently under review – to be republished in 2013
3002-6	Display Fireworks	Dec 2010	To be reviewed in 2013
3002-7	Ammunition and Explosives Risk Management for the DND and the CAF	N/A	In approval stages
C-09-005 Series			
C-09-005-001/TS-000	Volume 1 – Ammunition and Explosives Program Management and Life Cycle Safety	To be published in 2013 (currently undergoing Translation Accuracy Check)	Replaces A&EIs 13, 19 (Draft), 15, 17 and portions of C-09-153-001/TS-000.
C-09-005-002/TS-000	Volume 2 – Storage and Facility Operations (including storage related operations)	Dec 2012	Replaces A&EIs 03/07, 12, 16, 21, 22(draft) and portions of C-09-153-001/TS-000. Risk-based waiver provisions are not yet approved; A&EI 03/07 remains in effect for waivers.
C-09-005-003/TS-000	Volume 3 – Transportation	Jan 2011; revision to be published in 2013	Replaces Part 6 of C-09-153-001/TS-000
C-09-005-004/TS-000	Volume 4 – Demilitarization and Disposal	To be published in 2013	Replaces C-09-008-001/TS-000 published Oct 1993
C-09-005-005/TS-000	Volume 5 - Deployed Operations (encompasses FOB, Field, BLAHA and deployed ops Risk Assessment & Clearance of BDV)	To be published in 2013	Replaces A&EI 23 and C-09-153-001/TS-000 Part 4 Sect 15
C-09-005-006/TS-000	Volume 6 – Naval Vessels	To be published in 2014	Replaces C-09-153-003/TS-000 Published Mar 2008
C-09-005-007/TS-000	Volume 7 – Certification of Ammunition, Explosives and Accessories for Service Use	Oct 2011	Partially replaced D-09-002-010/SG-000 Published Mar 2007
C-09-005-008/TS-000	Volume 8 – Construction Standards	To be published in 2013	Replaces A&EI 26(Draft), 28(Draft), and portions of C-09-153-001/TS-000
C-09-005-009/TS-000	Volume 9 – Hazards of Electromagnetic Radiation to Ordnance (HERO)	To be published in 2014	Replaces and expands upon Part 10 of C-09-005-001/TS-000
Ammunition and Explosives Instructions			
01/07	Ammunition and Explosive Instructions	May 2007	
02/07	Review of Ammunition and Explosives Regulations and Instructions	June 2007	
03/07	Ammunition and Explosives Storage Licensing	July 2007	Still in force pending approval of DAOD 3002-7.
04	Transportation of Ammunition and Explosives Recovered during Domestic Explosive Ordnance Disposal Operations	Cancelled	Included in Volume 3 of the C-09-005 series.
05	Transportation of Munitions Scrap	Cancelled	Included in new Volume 3 of the C-09-005 series.

Document/Subject/ Theme	Brief Description	Date Current Document Published	Comment
06	Removal of Hard Targets from CF Ranges and Training Areas	Dec 2008	Change 1
07	Ammunition Accident/Incident Investigation and Reporting	May 2008	
08	Plastic Coated Tape, Explosives Safety Hazard – Electrostatic Discharge	Cancelled	Superseded by C-09-008-002/FP-000.
09	Crimping of Non-Electric Blasting Caps – Procedures and Protective Equipment	Cancelled	Superseded by C-09-008-002/FP-000.
10	Cartridge Signal 16mm No 1 Mk3	Cancelled	Superseded by C-74-370-CA0/TA-000
11	Disposal of Ammunition and Explosives at the End of Life Cycle	Sep 2011	Change 1
12	Ammunition Salvage Buildings	Cancelled	Included in new Volume 2 of the C-09-005 series.
13	Ammunition Amnesty Box Program	May 2009	To be included in new Volume 1 of the C-09-005 series.
14	Mitigation of Blast and Fragmentation Effects Utilizing Sandbags	Dec 2008	
15	Recognized Civilian Qualifications Applicable to Ammunition and Explosives Employment	Aug 2010	Change 2. To be included in new Volume 1 of the C-09-005 series.
16	Small Quantity Distance Tables	Cancelled	Included in new Volume 2 of the C-09-005 series.
17	Civilian Qualification Expiry Criteria	Jan 2009	To be included in new Volume 1 of the C-09-005 series.
18	Civilian Ammunition Technician Specification	Nov 2009	
19	Personnel Qualifications matrix	In development	To be included in new Volume 1 of the C-09-005 series.
20	Gauging for Serviceability – Cartridge 20mm Dummy C145A1	Cancelled	
21	Containment Vessels Siting and Storage Instructions	Cancelled	Included in new Volume 2 of the C-09-005 series.
22	Public Traffic Routes and Densities	Cancelled	Included in new Volume 2 of the C-09-005 series.
23	Explosive Clearance Inspection of Battle Damaged Vehicles	Dec 2009	To be included in new Volume 5 of the C-09-005 series.
24	Transfer of Small Quantities of Ammunition and Explosives Within HMC Dockyards	Mar 2010	Change 1
25	Stowage of Expendable Targets on Board HMC Ships	Feb 2010	
26	Construction Guidance for Facility Electrical Systems	In development	To be included in new Volume 8 of the C-09-005 series.
27	Ammunition Safety and Suitability for Service Assessments – Class Decisions	May 2010	Partially included in Volume 7 of the C-09-005 series. Remainder to go in revised D-09-002-010/SG-000.
28	Construction Guidance for Facility Heating Appliances	In development	To be included in new Volume 8 of the C-09-005 series.
29	Packaging and Return of Surplus Gun Propellant and Increments	Apr 2011	Change 1

Document/Subject/ Theme	Brief Description	Date Current Document Published	Comment
30	Accidental Small Arms Discharge Reporting	Dec 2010	Change 1
31	Destruction by Open Burning of Surplus Propellant on Approved Burning Trays	Aug 2012	Change 2. To be included in new Vol 4 of the C-09-005 series.
32	Ammunition and Explosives Safety Survey and Inspection	Sep 2012	Change 1
33	Flare Aircraft Parachute LUU-2D/B		contact LCMM for document
34	Approved Misfire Procedure for Electrically Initiated Disposal Operations	Oct 2011	
35	A&E Risk Management Process for Deployed Operations	In development	
36	Labels Applicable to Certification of Ammunition and Explosives	Nov 2012	
37	Safe Handling, Use and Employment of the Cap Blasting Electric M4 Assembly for use with the Defensive Command Detonated Weapon C19	In development	DAEME lead
38	Only Authorized Fresh Water Launch Procedure for Marker Location Marine C2A2	Apr 2012	
39	Miniature Magazine Concrete Earth-covered Three-Bay	Jul 2012	
40	Management Procedures for CRV 7 Rocket Motors Munition Scrap (MS) Potentially Containing Asbestos	Sep 2012	
41	Assessment and Confirmation of Level 1 Ammunition Technical Authorities	In development	
42	Approved Storage Procedures for FIXOR™ explosives	In development	
43	Canadian Forces Maritime Experimental and Test Ranges Ammunition and Explosives Embarkation / Disembarkation Area	Nov 2012	
44	Pre-Engineered Magazines	In Development	
Unexploded Ordnance (UXO) – Policy			
Standard 1606-4000.1-S02-020	Technical Instruction for Unexploded Explosive Ordnance (UXO) Activities	2010	Current. Supersedes ADM(IE) Standard 01/2008 dated 12 May 2008. OPI - ADM(IE)
ADM(IE) Standard 1606-4000.1-S10-020	Assignment of Responsibility for Managing Legacy Site Responsibilities		Current. OPI - ADM(IE)

Document/Subject/ Theme	Brief Description	Date Current Document Published	Comment
ADM(IE) Standard 1606-4000.1-S01- 024	Sustainable Range and Training Area Management		Current. OPI - ADM(IE)
CANFORGEN 181/06 ADM(IE) 002 282157Z NOV 06,	DND UXO and Legacy Sites Program		Current. OPI - ADM(IE)
B-GL-381-003/TS-000	Range and UXO Clearance Handbook		To be republished in 2013. OPI - ADM(IE) Director Real Property Planning 5
DAPC Pol Policy Guidance:	Procedures for Reporting and Destroying Chemical Weapons Discovered at DND/CF Facilities	Amendment, 02 August 2005	Current. OPI - DAPC Pol
EOD			
B-GL-005-316/TS-XXX	Operational Concept of Employment	Draft	Under revision. OPI - CF EOD
C-09-008-002/FP-000	Duds and Misfires Ammunition on CF Ranges and Training Areas	Sep 2011	
C-09-008-003/FP-000	Explosive Ordnance Disposal – Disposal of Stray Ammunition	May 2003	
Defence Administrative Order and Directive (DAOD) 8000-0	Explosive Ordnance Disposal	Under revision	OPI - CF EOD
Defence Administrative Order and Directive DAOD 8000-1	Explosive Ordnance Disposal Instructions	Under revision	OPI - CF EOD
International Policy Development			
Informal Working Paper (IWP) 1	Risk Management for Deployed Operations		This series of papers are designed to develop NATO A&E guidelines for domestic and deployed Multi-national operations in order to ensure international acceptance and application of safety standards. This includes the extension of rule-based to risk-based criteria for all aspects of the life cycle.
IWP 2	Operational Storage Principles for Manoeuvre Warfare		
IWP 3	AASTP-1 Custodian Working Group 14 Sep 10 Record of Discussion		
DDESB Paper – Risk Management Process for Ammunition and Explosives			

Document/Subject/ Theme	Brief Description	Date Current Document Published	Comment
External Liaison			
Avalanche Control	MOU between DND and Parks Canada Agency concerning the control of avalanches by artillery fire at Glacier National Park/Rogers Pass, British Columbia.	Oct 2012 (next revision due in 2017)	CJOC manages the annual military tasks (OP PALACI) and DND input into the five-year MOU review cycle.
RCN A&E Policy			
MARCORD 46-8	Defines the organizational structure and the requirements of the Maritime AESP.	Nov 08	OPI - RCN
MARCORD CS-06	Transportation of Explosives and Ammunition by Motor Transport, Ammunition Lighter, and Military Aircraft Within Maritime Command	Not Known	OPI – RCN. Contains outdated reference to C-09-153-001/TS-000 for road transport.
CA A&E Policy			
LFCO 22-12	Operational EOD	Dec 1995	OPI - CA
LFCO 22-11	LFC Range Clearance	Sep 1995	OPI - CA
RCAF A&E Policy			
B-GA-297-001/TS-000	Safety Orders For Canadian Forces Air Weapons Systems	June 2010	OPI – 1 Cdn Air Div / A4 Maint

Gunners from 30 Field Regiment fire a 105mm C3 Howitzer high explosive round from their gun as part of a live fire exercise during Exercise Wolf Pack Endeavour in Fort Knox, Kentucky, in February 2012.

Annex C

Ammunition and Explosives Safety Program Analysis - 2012

Deaths and Injuries

There were no deaths reported under the AESP in 2012. As shown in AESP Analysis Figure 1, there were 19 injuries spread over 12 accidents in 2012. All involved military members. One accident, suspected contamination by toxic materials, involved eight members. Only one injury (member accidently shot himself) was reported from theatre. Figure 1 shows the distribution of injuries by command/L1 for 2012.

Figure 2 provides a 10 year perspective. For the second year running, the number of deaths and injuries is below the 10 year average, but barely so.

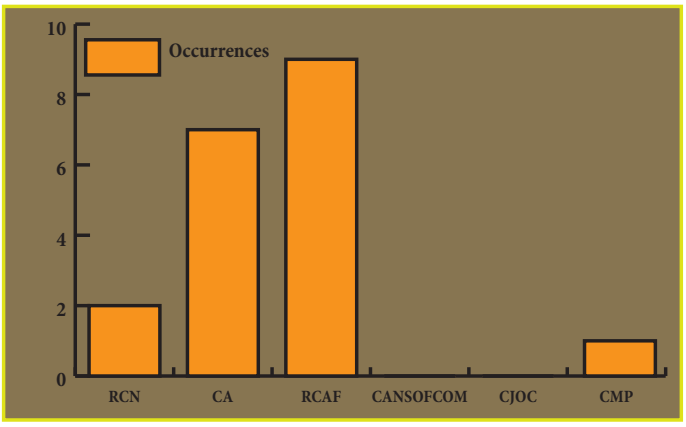


Figure 1 - Number of Injuries in 2012

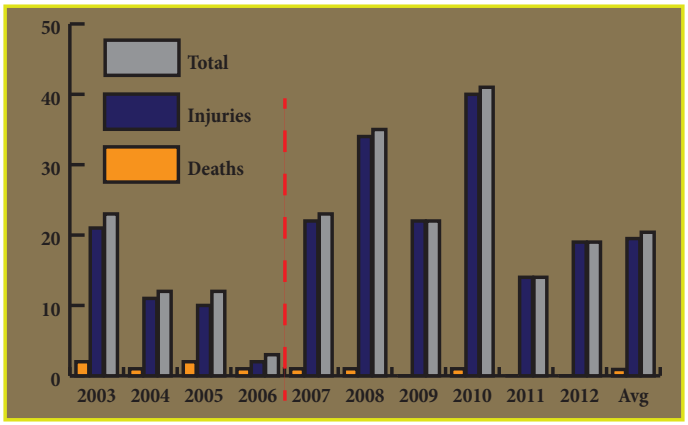


Figure 2 - Injuries and Deaths From 2003 Until 2012

Occurrences

A total of 243 Ammunition Accidents and Incidents, inclusive of ammunition related Flight Safety Occurrences[1], were recorded in 2012: 61 accidents and 182 incidents. This total is much higher than the 10 year average, shown in Figure 3. Due to changes in recording procedures (most notably FSOMS data was only incorporated starting in 2008), a four year comparison, as shown in Figure 4, is more appropriate. The 2012 total of 243 is 12% higher than the four year average of 216 occurrences.

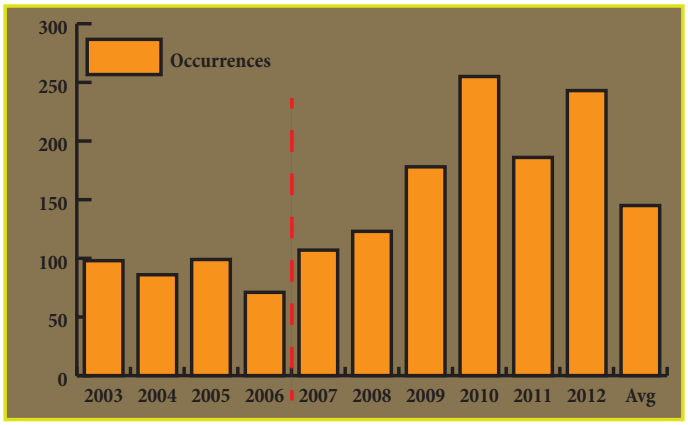


Figure 3 - Occurrences from 2003 until 2012

Figure 5 provides a breakout of accidents and incidents by Command/L1 for 2012. In order to better understand trends, Figure 6 shows a 4 year perspective, again by Command/L1. The occurrences reported for CJOC relate directly to CFAD operations. It should be noted that Figure 6 does not show data for OP ATTENTION: all three reports related to Accidental Discharges (two with damage, one with injury) and, in keeping with the methodology used in the 2011 report, have been rolled to CA as the Force Generator.

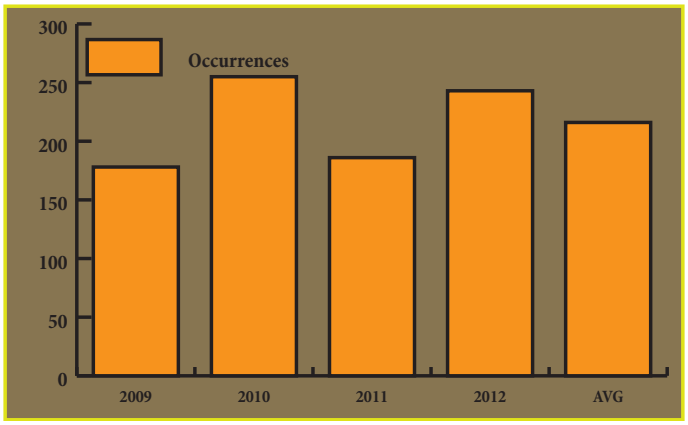


Figure 4 - Four Year Average

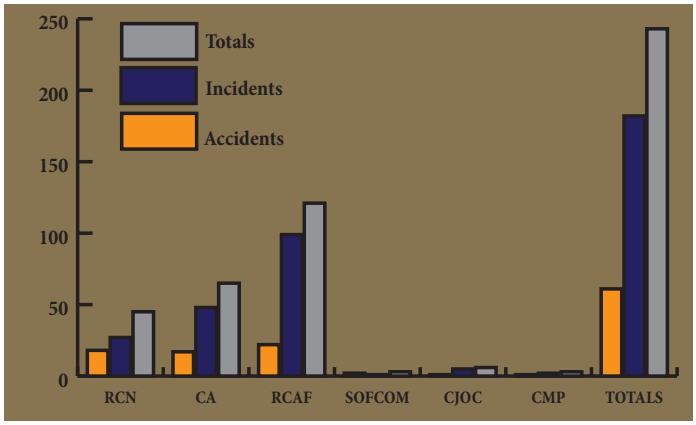


Figure 5 - Occurrences for 2012 by Level 1

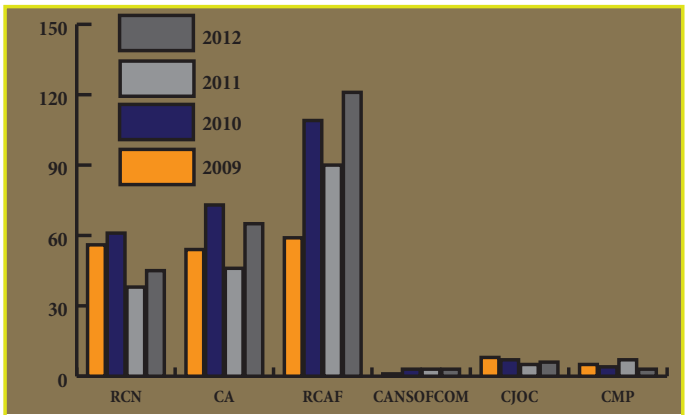


Figure 6 - Comparison by Level 1s 2009-2012

In 2010 the large increase in reporting was attributed to increased RCAF reporting and more specifically two factors: increased force generation activities in support of theatre operations and the decline in trade knowledge being addressed through the Air Operation Enhancement Program (AOEP). In 2012 there was another significant increase in RCAF reporting, in part attributed to continued improvement in DAER's ability to gather data, as well as how data is assessed[2].

1 AESP definitions for accident and incident do not correspond to those used within the Flight Safety Program. The AESP has a DND/CAF wide mandate. The reporting procedures have been modified to accept FSOMS reports in order to eliminate the requirement for duplicate reporting.

2 While no attempt was made to compare years in great detail, approximately 25% of the RCAF increase could be attributed to increased reporting of misplaced safety pins: seven occurrences in 2011, 15 in 2012.

There was a 15% increase in RCN reporting which is assessed as within normal variance. Both the RCN and RCAF are assessed as having a good culture of reporting.

The relative decrease in CA reporting in 2011 was explained in terms of reduced level of effort as the CAF withdrew from theatre. The 41 % upsurge (from 46 to 65) in reporting in 2012 can be explained by the upsurge in reporting emanating from CFB Suffield[3]: 26 reports, most dealing with unit control issues such as unit returns/salvage, range clearance and post-firing range sweeps, and items inappropriately disposed[4]. This very visible impact of a change in reporting practices at a single base illustrates the importance of working towards a more uniform reporting culture across the institution.

For the CA overall, 41 events or 63% of all occurrences related to poor unit control and lack of supervision. The ratio of accidents to incidents – approximately 1 to 3 - would seem to indicate a small improvement in reporting; however, if the CFB Suffield data is removed, the ratio is 1 to 1.3 – essentially unchanged from 2011. It should be noted that only three occurrences were reported from theatre[5] – all relating to accidental discharges with either damage or injuries. No incidents were reported from theatre.

There were only three known occurrences related to CANSOFCOM: two accidents and one incident. Of these, only one accident was reported using the AESP reporting system. A second accident was taken from a CF410 defect report. The incident was reported in summary form only and eight months after the incident.

MilPersCom is responsible for CFB Borden, a major training centre, and much of southern Ontario. Despite the high volume of on-base training, LFCA TC Meaford and large number of Reserve units supported by this base, only three occurrences (one accident, two incidents) were reported in 2012. Clarification of AESP responsibility for LCFA TC Meaford is required[6].

Over the past few years, AESP data has been compared with data held in the General Safety Program. Comparison for 2012 revealed two accidents that were reported through General Safety that went unreported to the AESP – both related to temporary hearing damage from use of pyrotechnics. The comparison also revealed nine accidents, all relating to injuries, reported to the AESP that had not been reported to the General Safety Program. Current policies requiring reporting under multiple safety systems is clearly a problem that should be addressed corporately.

A total of 78 occurrences involved Common User (SAA, smoke grenades, pyrotechnics) ammunition. Adding the most commonly used RCN and RCAF pyrotechnics, 164 of the 243 occurrences (67%) involved the most commonly used items of ammunition and explosives. This is comparable to previous years. Of 61 accidents, 36, including 7 of the 19 injuries, involved such items.

Cause Categories

All 243 occurrences from 2012 were attributed a cause. They are summarized at Figure 7.

CAUSE CATEGORY	NUMBER	PERSONNEL RELATED
Human Error (error in drill, mistake, poor judgement)	165	165
Deliberate Deviation	29	29
System or Weapon-related	28	
Other Causes	12	
Unassigned (investigation on-going)	8	
Ammunition-related (defect, malfunction, design error)	1	
TOTAL	243	194

Figure 7 - Cause Categories

Approximately 5% were categorized as Other. One was related to the recovery of a significant quantity of military (non-CAF) ammunition. Six were related to weather/heavy seas (marine markers and a ready-use locker activated or swept overboard). No cause could be determined for two incidents. A further 3% have not been assigned to a cause category as investigations were still underway.

Only one accident was attributed to a fault in the ammunition. While functioning, the handle of the paraflare separated from the launch tube, causing minor injury. Lots with potentially defective items were identified and quarantined, pending further investigations.

System or Weapon-related occurrences rose considerably (to 12% from 8% in 2011). There were 10 accidents, only one with injury: a sniper rifle fired while being handled through a culvert, despite being set on safe. This was the only CA occurrence in this category. There were nine in RCN; six related to main armament feed systems. There were 18 in RCAF: the majority related to chaff/flare and armament computer issues.

Personnel were responsible for 80% of all accidents and incidents. Carelessness, poor judgement, errors in drill, sometimes compounded by lack of supervision, were typical causes.

Occurrences are recorded as Deliberate Deviations when it is deemed that procedures had been deliberately contravened. There were 29 Deliberate Deviations reported in both 2011 and

3 CFB Suffield reports mainly reflect occurrences related to foreign units, which roll to the CA as the host.

4 E.g. discarded, abandoned, or placed in garbage.

5 In keeping with methodology from previous reports, "Land" occurrences were rolled to the CA.

6 The reporting chain with respect to ammunition accidents and incidents at LFCA TC Meaford is not clear. CFB Borden is the support base, however CFB Borden was not included on such reports. One accident and one incident were reported from Meaford. These were rolled to CANSOFCOM and to CA

2012[7]. They caused six accidents - all with damage but no injuries. In one case, a forest fire caused by improper firing technique and poor selection of date and location, cost DND in excess of $650K. Of the 29 Deliberate Deviations, one occurred in CJOC, two in RCAF, three in RCN, one in CMP and the remaining 22 occurred within CA units.

Lessons Learned

Unit control of ammunition, particularly in CA units where ammunition is more extensively used, needs to be strengthened. Greater diligence on the part of Range Safety Officers and supervisors in strengthening post exercise clean-up and declaration procedures would reduce risk to personnel conducting post-firing range sweeps; those transporting ammunition and ammunition salvage from ranges; and technicians taking and processing these returns. It would also help reduce finds of stray ammunition and an active Amnesty Box Program could limit inappropriate disposals. Approximately 60% of reported CA occurrences related to some aspect of poor unit control.

In 2012 there were two incidents and one accident involving Display ammunition. The incidents involved ammunition received by a museum without the proper certification. The accident involved an item that had been wrongly certified for use in a unit display. There have been similar occurrences over the past three years and in 2013 DAER's compliance program will look more closely at control of ammunition within museums and unit displays.

7 Accidents and incidents related to Deliberate Deviations are indicated in the 2012 Accident and Incident Summaries with a grey background. These summaries follow as Appendix 1 and Appendix 2 to Annex C.

Appendix 1 to Annex C

Summary of Accidents for the Year 2012

The following table summarizes accidents that occurred in 2012. Greyed out cells indicate a deliberate deviation.

Level 1	2012 Accident Summary	Date
RCN	During cable connection, member misaligned connector, damaging pins and putting missile out of commission	31 Jan 12
RCN	One round 57mm damaged due to improper loading by crewman	14 Feb 12
RCN	Jam in inner compartment of AM2 resulted in damage to one round 57mm BLP	18 Feb 12
RCN	Round did not function due to failure of firing pin - suffered case separation during extraction. Round jettisoned	21 Feb 12
RCN	During a Sea Training Damage Control Event (bomb threat and subsequent explosion), member was positioned in a deep shelter station. DM211 was thrown overboard to simulate an IED explosion. When the DM211 detonated the concussion from the blast and the subsequent noise generated through the hull of the ship caused severe ringing in member's ears and vertigo to the point where he couldn't continue monitoring the exercise	23 Feb 12
RCN	Member slightly burned on hand despite wearing gloves when Grenade Hand Smoke Screening functioned immediately on pulling of safety pin. Was assessed as error in drill.	24 Feb 12
RCN	40mm Ready Use Locker was swept from deck by exceptionally large wave	7 Apr 12
RCN	One round 57mm BLP was damaged during ramming (heavy seas) and was jettisoned	16 May 12
RCN	Frequent stoppages and cracked .50 cal empty casings attributed to crack in barrel of weapon	22 Sep 12
RCN	Lateral feed problem of 57mm mount damaged two rounds	4 Oct 12
RCN	Item held for display and training use functioned when handled by a trainee. Item had been inappropriately certified as Free From Explosives	17 Oct 12
RCN	20mm ammunition subjected to HERO UNSAFE environment as a result of belt connection failure	18 Oct 12
RCN	During investigation of stoppage, gun was elevated to check bore, resulting in one round of 40mm BLP sliding out and striking the deck, chipping rim	22 Oct 12
RCN	During torpedo storage/maintenance an arming wire was inadvertently pulled from a torpedo. Subsequent attempts to rectify the situation failed and the torpedo was considered effectively a dud	31 Oct 12
RCN	During clearance of a jammed gun feed system, one round of 76mm was damaged	20 Nov 12
RCN	Upper deck sentry lost magazine and rounds when his magazine went overboard into the harbour	21 Nov 12

Level 1	2012 Accident Summary	Date
RCN	Officer of the Watch discovered Marker Man Overboard hanging over the side, actively discharging light and smoke. It was presumably dislodged by heavy weather	25 Nov 12
RCN	Lateral feed failure in gun mount resulted in damage to 57mm BLP round	26 Nov 12
CA	During an exercise on an Urban Assault Course a member was adjudged to have been killed by an IED and subsequently fell to the ground. While on the ground another IED simulator went off in proximity to his head.	21 Feb 12
CA	A Simulator Projectile Ground Burst was exploded inside a chemical toilet, destroying the toilet	29 Apr 12
CA	Student officer hit in eye subsequent to explosion of Thunderflash. Thunderflash was thrown too close to students, who were not wearing ballistic eyewear as they were in an administrative area.	13 Jul 12
CA	When member stood up the safety pin of the smoke grenade that he was improperly carrying on his tactical vest was snagged on a carabineer. Grenade ignited, damaging tactical vest and fragmentation vest. Study conducted subsequently indicated that in-service tactical vest does not require change.	20 Jul 12
CA	L83A1 Smoke Grenade functioned in tactical vest. Grenade was carried in grenade pouch with handle protruding. Handle caught on trench wall, twisted sufficiently for safety pin to bend out of position, releasing the striker. Study conducted subsequently indicated that in-service tactical vest does not require change.	1 Aug 12
CA	During a demonstration firing, the breech of an ABL 2000 Disrupter was blown 200 m to the rear of the weapon.	15 Aug 12
CA	Accidental Discharge of sniper rifle while being passed through a plastic culvert. One member injured by plastic fragments. Attributed to weapon malfunction.	29 Sep 12
CA	Ball round was fired through a weapon fitted with a BFA, damaging weapon, BFA and injuring an enemy force member. Earlier in day member had been firing ball rounds on range with mechanical targets. Attributed to human error: on part of member who loaded magazine to weapon and on part of supervisor who failed to ensure ball rounds were withdrawn prior to issue of blank rounds	3 Oct 12
CA	9mm pistol was damaged when a round functioned before the slide was fully locked.	11 Oct 12
CA	During a training exercise the breech block assembly of a disrupter was blown approximately 100m behind the firing point and the barrel 80m forward.	12 Oct 12
CA	During movement of ammunition between buildings, forklift hit a snow-covered pothole and subsequent bounce caused straps to loosen and an ammunition container to fall to the roadway. Forklift then ran over ammunition container	1 Nov 12
CA	Member opened his barracks box and a grenade hand smoke discharged.	12 Nov 12
CA	.50 cal barrel cracked due to firing when the barrel was improperly locked in the barrel extension.	28 Nov 12
CA	Staff member burned when the handle of the third paraflare that he fired separated from the launch tube. Attributed to an ammunition defect.	29 Nov 12
CA	Accidental discharge of C7A2 rifle subsequent to cleaning. One round pierced roof of accommodation unit. Attributed to cleaning weapon with loaded magazine attached. Occurred in theatre	20 Mar 12
CA	Accidental Discharge of pistol during preparation for cleaning. Occurred in theatre	18 Sep 12
CA	Member accidentally shot himself in the foot while retrieving a dropped magazine. Occurred in theatre	15 Dec 12

Level 1	2012 Accident Summary	Date
RCAF	Sonobuoy was being loaded during taxi and dropped through the chute, hitting the ground. Note 1	04 Jan 12
RCAF	During a weapons load, the ordnance was mishandled and fell onto the crew chief, causing injury. Weapon was not damaged. Note 1	13 Mar 12
RCAF	Modular Practice Bomb was dropped while being unloaded from an aircraft, denting the nose. Note 1	20 Apr 12
RCAF	Technician conducting inspection of guidance and control section of AIM9 missile dropped the section, resulting in fracturing of the dome. Note 1	02 May 12
RCAF	During pyrotechnic refresher training a 16mm flare was fired into a gravel pit, ricocheted into nearby woods and started a fire which spread out of control.	25 May 12
RCAF	.50 cal machine gun suffered a stoppage after 2 or 3 rounds. Investigation revealed part of the extractor disappeared in flight. Attributed to improper installation. Note 1	01 Jun 12
RCAF	GBU-12 knob broken off, attributed to poor technique. Note 1	21 Jun 12
RCAF	During hover as aircraft prepared to land, a C2A2 Smoke Marker fell from the aircraft onto the flight deck. Attributed to attention failure on part of Airborne Electronic Sensor Operator (AESOP). Marker jettisoned. Note 1	10 Jul 12
RCAF	Fuel tank accidentally jettisoned while performing functional test. Note 1	16 Jul 12
RCAF	During download of AIM 7 missile onto trailer, missile-munition loading adapter (MMLA) sheared, causing missile to fall to the ground. Note 1	16 Jul 12
RCAF	Excessive pressure during loading of aircraft bomb damaged sway brace adapter, causing it to be lost in flight. Note 1	06-Sep-12
RCAF	Gun load gate sheared during firing as the load gate rod was inadvertently contacted during loading. Note 1	12 Sep 12
RCAF	When engine fire light did not illuminate during test, pilot physically checked the pushbutton was fully out, inadvertently causing the fire bottle to discharge. Note 1	13 Sep 12
RCAF	Technician inadvertently caused Survival Kit Air Droppable (SKAD) thruster to fire while trying to remove tape from cable. Human Error cited (poor technique) and use of improper tape type. Note 1	21 Sep 12
RCAF	While attempting to disarm the winch guillotine system, the operator accidentally fired it, shattering the blade. Note 1	23 Sep 12
RCAF	Box of ammunition was lost during shipment to USA. Possible theft. Under investigation	28 Sep 12
RCAF	During functional check, technicians inadvertently caused two external fuel tanks to jettison. Note 1	05 Oct 12
RCAF	Sonobuoy dropped on runway during take-off. Note 1	09 Oct 12
RCAF	During loading the load gate rod was inadvertently bent, causing difficulties during unloading and some damage to ammunition. Note 1	11 Oct 12
RCAF	Failure to properly check and clear ammunition packaging resulted in ARD863 cartridges destroyed in disposal fire. Poor SOP, lack of control over items placed in burn pit and low level of supervision all cited.	29 Oct 12
RCAF	Eight members were possibly exposed to toxic materials from C12 Impact Markers used in modular practice bombs.	31 Oct 12
RCAF	Turning aircraft struck a power unit with a Captive Air Training Missile, damaging the missile. Note 1	28 Nov 12

Level 1	2012 Accident Summary	Date
CANSOFCOM	C8 weapon suffered damage to bolt locking lug and upper receiver when 5.56mm round fired before the bolt was fully closed. Attributed to foreign object on bolt face	14 Feb 12
CJOC	Forklift hit bump while transporting unsecured load, causing an M19A1 container to fall from the pallet. Forklift ran over can, damaging can contents	8 Feb 12
CMP	Member reported to hospital complaining of ear pain, citing functioning of artillery simulator within 15m of front end loader that he was operating.	22 Feb 12
NOTE 1	Originally reported in FSOMS	

Appendix 2 to Annex C

Summary of Incidents for the Year 2012

Incident Summary. The following table summarizes incidents that occurred in 2012. Greyed out cells indicate a deliberate deviation.

Level 1	2012 Incident Summary	Date
RCN	C2A2 Smoke Marker damaged during removal for storage. Foam ring was missing, allowing the bottom plug portion of the marker to contact and freeze to the ice at the bottom of the container. During removal, bottom plug portion was torn from the marker.	19 Jan 12
RCN	While unloading a MK46 torpedo, the battery arming lanyard became fouled and broke without releasing the arming plunger. Step in unloading checklist had not been followed.	20 Jan 12
RCN	During truck transfer of Marker Location Marine, Jetty NEQ limit was exceeded.	31 Jan 12
RCN	While towing target into position and before calling "On Top", ship fired on target, risking aircraft and crew.	07 Mar 12
RCN	Queen's Harbour Master vessels not monitoring expiry dates of SOLAS stores	07 Mar 12
RCN	Member of ship's company transmitted with a VHF PRC during disembarkation of ammunition, contrary to regulations.	19 Mar 12
RCN	During shut down of Base Security Force vault, three inert pyrotechnic items were found behind a locker. Items were not registered in a dummy or display register (none existed) and had not been inspected or properly certified.	28 Mar 12
RCN	Sonar reeling machine was routed to contractor for maintenance while still loaded with cartridges.	03 May 12
RCN	Incompatible storage. Pyrotechnics temporarily stored in empty torpedo locker were not removed when torpedoes were embarked.	13 May 12
RCN	Upper deck sentry was checking cable position when the magazine fell from his rifle onto the deck, dislodging a round, which fell overboard.	22 May 12
RCN	During annual FAI inspection, an armed Marker Location Marine was discovered in a smoke locker	04 Jun 12
RCN	Firefighting system activated unintentionally, flooding three magazines. Chaff rockets exposed to salt water were quarantined.	17 Jun 12
RCN	Flight Technician unfamiliar with procedures at sea, resealed armed MLMs in original packaging.	14 Aug 12
RCN	Signal Distress Day and Night lost from diver's buoyancy compensator vest during dive.	10 Sep 12
RCN	Welding preparations, including use of needle gun, were conducted on board without required hot work chit.	17 Sep 12
RCN	HAZMAT containers were stored within 6m of Harpoon Missile launchers.	17 Sep 12
RCN	Maintenance crew unbolted and moved pyrotechnics locker without clearance and while locker still contained pyrotechnics	21 Sep 12
RCN	Storage waiver for temporary use of a ready-use locker for storage of DM211 continued despite expiry of waiver.	24 Sep 12

Level 1	2012 Incident Summary	Date
RCN	Heavy seas knocked Marker Location Marine from mount and sea water ingress activated unit.	01 Oct 12
RCN	When Expeditionary Opposed Boarding Team disembarked ship, team left container of CEASS ammunition in rope stores.	03 Oct 12
RCN	Incompatible storage on board ship - SAA, rags and POL stored in same space	26 Oct 12
RCN	During de-ammunitioning of a ship, CFAD staff discovered a live RADARFLARE buried in bubblewrap inside an open box returned as salvage.	26 Oct 12
RCN	Live 20mm rounds discovered in box marked for DUMMY ammunition.	26 Oct 12
RCN	Marker Man Overboard was dislodged and partially functioned due to heavy seas	07 Nov 12
RCN	During manoeuvring in heavy weather, a wave dislodged a Marker Man Overboard, causing it to activate.	26 Nov 12
RCN	Marker Manoverboard was lost over the side due to heavy swells.	26 Nov 12
RCN	Subsequent to firing, a 40 mm cartridge casing was discovered to have a longitudinal crack. Attributed to denting caused by use of the unloading tool prior to firing of gun.	07 Dec 12
CA	Chevrolet Colorado transporting ammunition slid off road and flipped in ditch. No damage to ammunition.	20 Jan 12
CA	YOUTUBE video discovered showing snowman being destroyed with an artillery simulator	01 Feb 12
CA	Paraflare C7 fired in civilian area without authority	24 Feb 12
CA	Practice Grenade fuze was unwittingly fitted to dummy grenade body during dry training, then thrown. No injuries or damages	05 Mar 12
CA	Five rounds 5.56mm Ball found in unit salvage return.	18 Mar 12
CA	Four blank 7.62 mm cartridges were discovered in the tank of a portable toilet.	22 Mar 12
CA	During receipt of ammunition from a unit, 5690 Cartridges .22 cal were received that were not on account. Unit took control of ammunition found in drawer of a supply room formerly used by another unit.	02 Apr 12
CA	During third level screening of ammunition components recovered during range clearance operations, two misidentified items containing energetic material were identified, segregated, and then destroyed	11 Apr 12
CA	A ball cartridge was found mixed in with blank in a box containing loose cartridges. Attributed to unit error during repackaging.	19 Apr 12
CA	A Pains Wessex Grenade Hand Smoke Blue was initiated in a barracks occupied by sleeping soldiers	05 May 12
CA	Member of visiting forces found and reported a dud 155mm HE projectile; however, in the process of doing so, he wrote directly on the dud, thereby contravening Range Standing Orders to not disturb dud munitions.	08 May 12
CA	Two paraflares landed on private property while still burning. Unit had not taken account of high wind conditions.	14 May 12
CA	Visiting forces unit personnel carried out range clean up during which two personnel carried a live (dud) projectile 105 mm Smoke Base Ejection C18 in a military vehicle along with ammunition salvage and garbage.	13 Jun 12
CA	Workers at Gas City Metals discovered four small arms rounds in scrap being removed from scrap steel bin that had been moved from a base ammunition compound.	25 Jun 12
CA	Salvage received from unit was found to contain augmenting cartridges, despite FFE procedures.	28 Jun 12
CA	16 unused trip flares were discovered in a post pallet returned with other ammunition salvage. No FFE certificate was in evidence.	28 Jun 12

Level 1	2012 Incident Summary	Date
CA	Fifteen Cartridge Flash Bang Smoke Simulator L1A1 were discovered loose on the ground in a parking area.	05 Jul 12
CA	Post-firing range sweep gathered inappropriate items including a misfired parachute flare.	25 Jul 12
CA	Qty 85 5.56mm Blank cartridges were discovered in a pile of garbage between a garbage bin and a wood bin.	27 Jul 12
CA	One cartridge 5.56mm Blank and one cartridge Flash Bang Sound Simulator were found in old amnesty boxes being used as road barriers at the landfill.	27 Jul 12
CA	Qty 36 Augmenting Cartridge TL Mk 2/p were discovered in fibreboard tubes turned in as scrap. Tubes had not been properly cleared by returning unit.	31 Jul 12
CA	Parachute Flare C7 failed to fire. Member brought flare close to body to examine cause and, in attempting to set the dial to "S" turned the handle, causing the flare to fire.	14 Aug 12
CA	Base Museum accepted donation of ammunition and pyrotechnics without having items certified by qualified personnel.	17 Aug 12
CA	Two Igniters Time Blasting Fuse Electric crimped to lengths of Fuse Blasting Time discovered in unlocked file cabinet during Unit Ammunition Representative handover.	27 Aug 12
CA	More live ammunition reported in Base Museum. Complete verification of museum holdings to be conducted.	28 Aug 12
CA	While screening ammunition salvage, four Paraflare tubes were discovered with the ignition wire and cap intact - indicating the ammunition had been tampered.	30 Aug 12
CA	Unauthorized access to ammunition destruction area by roads and grounds staff	09 Sep 12
CA	Dud Simulator Projectile was recovered from a bag of functioned pyrotechnics subsequent to a post-firing range sweep	17 Sep 12
CA	Dud Paraflare was recovered from garbage bag during post-firing range sweep.	19 Sep 12
CA	Two rounds 105mm HEPD were discovered in range area, presumably having fallen from a vehicle.	19 Sep 12
CA	Unauthorized storage of SAA in sub-unit lines	26 Sep 12
CA	During post-firing range sweep, two dud Thunderflashes were recovered and placed in amnesty box along with other items. Error in identification and disposal during range sweep and duds had not been marked and reported by using unit.	28 Sep 12
CA	During inspection of field storage site inadequate security precautions were identified.	05 Oct 12
CA	Sealed crate was returned to ammunition salvage building. Salvage personnel discovered SAA and simulators in crate.	09 Oct 12
CA	DND civilian turned in 30 rounds 5.56mm blank that he found in a McDonald's parking lot.	19 Oct 12
CA	Seven smoke grenades and several bags of ammunition salvage were discarded by waste bins when an exercise was terminated early due to cold weather.	27 Oct 12
CA	Pyrotechnics and SAA discovered in a mukluk and a tactical vest by Clothing Stores personnel	01 Nov 12
CA	Seven 105mm Tank Blank cartridge cases that had been tampered (base plates sawn off) were discovered in a unit return. Only 6 of 7 primers were returned.	01 Nov 12
CA	During range clearance operations, one projectile 30mm AFV HE L13 was picked up and moved for processing as scrap.	02 Nov 12
CA	Hunters had discovered a large quantity of DND ammunition hidden in thick brush.	04 Nov 12
CA	Box containing three smoke grenades was found in a roadside ditch in training area.	04 Nov 12
CA	From press report: Montreal Police recovered 40,000 rounds, some military. Further investigation determined the ammunition was never CAF in origin.	05 Nov 12

Level 1	2012 Incident Summary	Date
CA	During range clearance operations, dud illumination candles were picked up and moved for processing as range scrap.	06 Nov 12
CA	During range clearance operations one 155mm Projectile Flash L19A1 was misidentified as Projectile 155mm Practice Inert and picked up and moved. There was no record of this nature having been fired at that location and pre-clearance training has not included this nature.	06 Nov 12
CA	Live ammunition was discovered in a unit ammunition salvage return.	23 Nov 12
CA	During recertification of display ammunition, one Projectile 120mm SH-P was found to contain four live tracer elements, missed during initial certification two years earlier.	07 Dec 12
CA	Contractor discovered 30 blank 5.56mm rounds and a dummy IED training aid in a vehicle sent for maintenance.	07 Dec 12
CA	Member intercepted at airport with 25mm TPDS-T round in his possession	14 Dec 12
RCAF	During pre-flight walk-around, Miniature Detonation Cord (MDC) handle pins were discovered in the pin tree, while MDC unit pins were installed in MDC units. Note 1	03 Jan 12
RCAF	Aircraft discovered with armed ejection seat - attributed to human error on part of technician "riding brakes" during towing operations. Note 1	03 Jan 12
RCAF	Seat and MDC handle discovered unsafe on walk-around. Note 1	05 Jan 12
RCAF	During pre-flight walkaround seat and MDC handles were found in stowed positions. Out-going pilot failed to properly conduct post-landing checklist and inspecting technician failed to follow the Preparation Card of the Thruflight inspection. Note 1	05 Jan 12
RCAF	During NACES seat de-arming, cartridge was damaged. Excessive torque had been applied during installation. Note 1	12 Jan 12
RCAF	Aircraft flew without the armament load shown on aircraft documentation. Note 1	13 Jan 12
RCAF	Ejection seat pin was not replaced after landing. Note 1	23 Jan 12
RCAF	After mission, pilot shut down and exited aircraft without installing the ejection seat and canopy safety pins. Note 1	24 Jan 12
RCAF	LAU-115 launcher was jettisoned during snag/functional check. Attributed to failure of technician to check all stations and failure of supervision. Note 1	27 Jan 12
RCAF	Time expired cartridge discovered during installation in an aircraft at Cold Lake. Cartridge had previously been removed from an aircraft at Tyndall AFB, but could not be tracked to a particular aircraft. Note 1	31 Jan 12
RCAF	Airborne electronic sensor operator inadvertently fired thruster on survival kit air droppable. Attributed to operator error and inappropriate assignment of personnel. Note 1	10 Feb 12
RCAF	Newly installed engine fire bottles were found to be time-expired. Attributed to error of supervision. Note 1	22 Feb 12
RCAF	Uncommanded chaff flare release. Cause factor undetermined, but considered related to aircraft rather than ammunition. Note 1	24 Feb 12
RCAF	Pilot fired on a target without clearance from Forward Air Controller (FAC). Note 1	01 Mar 12
RCAF	During A-check, upper forward fin retainer was not engaged on the missile fin. Cause undetermined. Note 1	01 Mar 12
RCAF	Shielded Mild Detonating Cord (SMDC) lines discovered to have bent booster tips, attributed to error during installation. Note 1	06 Mar 12
RCAF	Tail probe CAD found to have been incorrectly installed. Note 1	12 Mar 12

Level 1	2012 Incident Summary	Date
RCAF	During de-installation, SMDC lines discovered to have crushed tips. Attributed to technician error during installation. Note 1	12 Mar 12
RCAF	Laser Guided Training Round dropped without use of laser - pilot error. Note 1	14 Mar 12
RCAF	During pre-flight check, pilot discovered ejection seat and canopy MDC handle safety pins were not installed - both in armed condition. Note 1	15 Mar 12
RCAF	OPP and MP Flt conducted training using HME without appropriate authorization.	19 Mar 12
RCAF	CAD serial found not to match ADAM records and lot number not marked on CAD. Note 1	28 Mar 12
RCAF	SMDC line discovered with bent tip. Attributed to error on installation. Note 1	30 Mar 12
RCAF	Both pilots failed to remove MDC pins prior to take-off. Note 1	07 Apr 12
RCAF	Pilot omitted to disarm ejection seat handle prior to egressing airplane. Note 1	16 Apr 12
RCAF	Pilot misunderstood attack request from FAC and delivered attack using Mk82 bomb vice 20mm. Note 1	16 Apr 12
RCAF	During pilot cockpit check, discovered front seat canopy fracturing system pin was not installed. Note 1	16 Apr 12
RCAF	Aircraft armament computer showed zero MPBs remaining, when two MPBs remained on dispenser. Attributed to recent change in intervalometer. Note 1	17 Apr 12
RCAF	Aircraft armament computer showed zero MPBs remaining, when four MPBs remained on dispenser. Attributed to recent change in intervalometer. Note 1	17 Apr 12
RCAF	Aircraft armament computer showed zero MPBs remaining, when three MPBs remained on dispenser. Attributed to recent change in intervalometer. Note 1	17 Apr 12
RCAF	Aircraft armament computer showed zero MPBs remaining, when four MPBs remained on dispenser. Attributed to recent change in intervalometer. Note 1	17 Apr 12
RCAF	Aircraft armament computer showed zero MPBs remaining, when one MPB remained on dispenser. Attributed to recent change in intervalometer. Note 1	18 Apr 12
RCAF	Student pilot opened canopy prior to replacing the ejection seat and MDC pins. Note 1	24 Apr 12
RCAF	Aircraft canopy jettison rocket motor was incorrectly installed. Note 1	27 Apr 12
RCAF	Aircraft was not safetied prior to civilian tour. Note 1	30 Apr 12
RCAF	During pre-flight inspection, discovered Canopy Fracturing System handle safety pin had not been re-installed at the end of the previous mission. Note 1	04 May 12
RCAF	Laser Guided Training Round (LGTR) did not guide. Attributed to undetected progressive breakdown. Note 1	07 May 12
RCAF	Two aircraft were shutdown prior to being dearmed/safetied. Note 1	08 May 12
RCAF	Contractor shipped sea container from theatre, the contents of which included two fire bottles, one of which contained two cartridges. Discovered during receipt inventory. Note 1	11 May 12
RCAF	LGTR impacted off target due to pilot error Note 1	14 May 12
RCAF	During removal of fire extinguisher bottle, a fire extinguisher cartridge was damaged. Attributed to poor technique in that the shorting plug had not been properly installed. Note 1	14 May 12
RCAF	Procedural differences led to visiting aircraft being jacked while still loaded with chaff and flare. Note 1	16 May 12
RCAF	Three C2A1 smoke markers were dropped in quick succession, the last one landing within 200 feet of Canadian Coast Guard Ship (CCGC) Sambro. Note 1	18 May 12

Level 1	2012 Incident Summary	Date
RCAF	Aircraft operating under Transport Canada auspices dropped BDU 33 immediately upon pickle, not delaying until computed release point. Note 1	22 May 12
RCAF	During flight, right seat pilot noticed on the CCU that 4 flares were missing from the original flare load. Note 1	25 May 12
RCAF	Contractor discovered smoke flare in dispenser of aircraft returned subsequent to test flight. Note 1	28 May 12
RCAF	Aircraft flew over another aircraft being armed Note 1	29 May 12
RCAF	Mk 82 bomb was built up with one fin incorrectly positioned. Error was noted and marked, however was not immediately corrected. Bomb eventually lost marking and was delivered to first line technicians who noted error. Note 1	08 Jun 12
RCAF	SMDC tip found bent. Attributed to error during installation. Note 1	08 Jun 12
RCAF	Uncommanded flare release during aerobatics, cause undetermined. Note 1	08 Jun 12
RCAF	C2A2 smoke marker was jettisoned after becoming wet during wet hoist evolution. Note 1	17 Jun 12
RCAF	Flares did not dispense on command, attributed to undetected progressive breakdown, possibly due to manufacturer over-torquing screws. Note 1	21 Jun 12
RCAF	During a mission a CAD was discovered missing from a sonobouy. Attributed to human error in that a previously misfired CAD had been jettisoned and retained sonobouy had not been refitted with CAD. Note 1	27 Jun 12
RCAF	Runaway C6 GMPG attributed to bent trigger guard (undetected progressive breakdown). Note 1	27 Jun 12
RCAF	Formation of two aircraft overflew an active firing range. Lack of range control frequency and outdated maps cited. Note 1	28 Jun 12
RCAF	Seat pin not installed - pilot oversight. Note 1	09 Jul 12
RCAF	APU fire extinguisher was inadvertently discharged when power was applied. Note 1	12 Jul 12
RCAF	Technicians removed fuel tank jettison cartridges from wrong aircraft. Attributed to inattention/complacency. Note 1	18 Jul 12
RCAF	Cartridge for flare ignited, but flare only departed 90% of the way out of dispenser. Attributed to armament systems undetected progressive breakdown. Note 1	19 Jul 12
RCAF	Three unfired bird scare cartridges discovered alongside taxiway. Note 1	10 Aug 12
RCAF	Contracted training aircraft parked with unsafe ejection seat. Note 1	12 Aug 12
RCAF	Three armed C2A2 smoke markers were discovered on board tasked aircraft. Note 1	14 Aug 12
RCAF	Engine fire bottle was inadvertently discharged during maintenance of lighting system. Note 1	21 Aug 12
RCAF	Aircraft flew without certification of ejection seat. Note 1	28 Aug 12
RCAF	Student pilot failed to remove MDC pin prior to flight. Note 1	31 Aug 12
RCAF	Inert Mk82 bomb failed to drop despite numerous efforts. Attributed to failure of technician to replace expended cartridges or technician used expended cartridges. Note 1	05 Sep 12
RCAF	Formation of three aircraft flew through an active AAG range unaware that it was active. Attributed to pilot and supervisory error, and shortfalls in local documentation. Note 1	12 Sep 12
RCAF	Chaff and flare failed to dispense. Note 1	17 Sep 12
RCAF	Aircraft chaff and flare failed to dispense. Note 1	17 Sep 12
RCAF	Misfire of ALE-47 system for no apparent reason. Note 1	19 Sep 12
RCAF	Cockpit ground safety pins were not installed. Note 1	27 Sep 12
RCAF	Bomb rejected for loading due to incorrectly installed tail assembly. Note 1	02 Oct 12
RCAF	SMDC line tips discovered bent. Note 1	11 Oct 12

Level 1	2012 Incident Summary	Date
RCAF	During a servicing inspection unaccounted day-night flares were discovered in the SAR Paul Bunyan, leading to procedural changes. Note 1	12 Oct 12
RCAF	Maintenance was performed on a loaded aircraft without authorization. Note 1	16 Oct 12
RCAF	During pre-flight inspection, pilot discovered pylon jettison cartridges had not been installed. Note 1	17 Oct 12
RCAF	During C6 firing the Self Defence Suite (SDS) Counter-Measures Dispenser System (CMDS) reported missile approach and fired flares. No missile was encountered. Note 1	17 Oct 12
RCAF	Live 20mm TP rounds discovered stored with empty casings. Note 1	18 Oct 12
RCAF	During airborne weapon training exercise, a boarding specialist fired a weapon from the cargo door without permission from the aircraft captain. Note 1	25 Oct 12
RCAF	Media report of find of military explosives north of Dundurn. Detailed report indicated deceased owner was former RCMP EDU member. 6 inch beehives only military explosives.	07 Nov 12
RCAF	During emergency approach of allied aircraft it transited an air weapons range wherein the active aircraft was receiving contradictory information from two sources. Note 1	08 Nov 12
RCAF	Technician inadvertently caused fire bottle to discharge when conducting a functional test on an aircraft. Note 1	09 Nov 12
RCAF	Subsequent to fuelling, technician discovered C2A2 smoke marker on the ground beneath the armament chutes. Note 1	14 Nov 12
RCAF	Aircrew member forgot to install his seat pins after landing. Note 1	18 Nov 12
RCAF	Load crew discovered an LGTR had not been properly assembled. Note 1	19 Nov 12
RCAF	SMDC line found damaged - attributed to poor technique during installation. Note 1	21 Nov 12
RCAF	20 minute road flares were purchased LPO without authorization and stored in an unlicenced location.	21 Nov 12
RCAF	Failure to dispense flares attributed to undetected progressive breakdown of chaff/flare dispenser pod. Note 1	24 Nov 12
RCAF	Uncommanded launch of sonobuoy. Note 1	28 Nov 12
RCAF	Chaff did not dispense. Note 1	29 Nov 12
RCAF	Pilot failed to have aircraft dearmed prior to taxiing to the flight line. Note 1	04 Dec 12
RCAF	Visitor was allowed into the cockpit without the aircraft being safetied. Note 1	04 Dec 12
RCAF	LGTR failed to release on command. System was set to safe, but bomb dropped approximately 25 seconds later, while still over range. Note 1	04 Dec 12
RCAF	Tail probe and messenger probe cartridges discovered to be expired. Note 1	06 Dec 12
RCAF	Tail probe cartridge was discovered to have been installed without an O-ring. Note 1	11 Dec 12
RCAF	Aft cabin crew experienced runaway gun. Note 1	14 Dec 12
RCAF	Explosive cartridge for Crash Position Indicator was discovered to be expired. Note 1	17 Dec 12
RCAF	Aircraft was parked in hangar with five C2A2 smoke markers on board. Note 1	17 Dec 12
RCAF	Emergency sonobuoy was discovered to be expired and not to have been fitted with a CAD. Note 1	20 Dec 12
CANSOFCOM	Failure to follow operating instructions resulted in extremely high dud rates.	5 May 12
CJOC	Discrepancy in receipt of shipment from theatre. Of 12 lots received, five were surplus, 4 deficient and one unvouchered. Total five Fragmentation Grenades deficient. Attributed to accounting error, not theft.	08 Feb 12
CJOC	Inadequate dunnaging of load of Laser Guided Training Rounds resulted in shifting of load.	19 Sep 12

Level 1	2012 Incident Summary	Date
CJOC	Wooden ammunition boxes with intact markings were recovered from scrap wood disposal bin, temporarily placed within the administrative area of CFAD.	24 Sep 12
CJOC	During inspection of aids to production, CFAD staff discovered two live 6 Pdr cartridges in containers with Free From Explosives labels	15 Oct 12
CJOC	During movement of an ammunition cage/pallet from a trailer, a cage leg caught the edge of the trailer. Cage came to rest on side of trailer.	01 Nov 12
CMP	Civilian police seized smoke grenade from member, who later admitted taking it and SAA from training exercises.	22 Feb 12
CMP	OPP Explosives Disposal Unit conducted HME training at CFB Borden without appropriate authorization from NDHQ.	16 May 12
NOTE 1 Originally reported in FSOMS		

Nash Stewart, from Prince Edward Island, in the shooting position during the cadet male senior (7.5 km) pursuit, at Martock, Nova Scotia, on March 6th, 2012.

Annex D

Status of Main UXO Program and Legacy Sites - 2012

The full extent of UXO risk management activities, including site reconnaissance, UXO avoidance, site characterization, clearance and public information sessions, were conducted at legacy sites across Canada in 2012. The table below describes these sites, including the legacy issues and risk management activities:

Site Name	Legacy Issue	Activities conducted in 2012 an planned for 2013	Risk Assessment Status
Western Region			
Rogers Pass, BC	Support to Operation PALACI Avalanche Control Program between DND and Parks Canada.	• Risk assessment and risk management support to CF and Parks Canada complete. • Contracted support finished and responsibility for long-term support transferred back to CAF.	• Record of Legacy Site Risk Management (RLSRM) w/ unmitigated risk of MEDIUM and mitigated risk of LOW

Site Name	Legacy Issue	Activities conducted in 2012 an planned for 2013	Risk Assessment Status
Tofino, BC	Tofino, BC was the site of a RCAF Station from 1942-1957. The RCAF used Wickaninnish Beach and Florencia Bay as target ranges. The Army used Wickaninnish Beach as a coastal defence training area.	• Temporary UXO warning signage installed on Wickaninnish Beach Sand Dunes and Florencia Island in 2012. • Public information sessions delivered in 2012. • UXO Avoidance services provided to Parks Canada in 2012. • Site characterization activities and in-depth historical research planned for 2013. • On-going communications activities.	• Initial Risk Assessment Report (IRAR) rating of MEDIUM for Florencia Bay • IRAR rating of HIGH for Wickaninnish Bay
Tsuu T'ina First Nations, AB	A total of 5300 Ha of potentially UXO-affected land from approximately 70 years of live-fire practice by the military from 1908 to 1980. A major clearance occurred in the area during period 1985–2005. Residual UXO risk is unknown.	• Ad hoc construction support completed in 2012 • BBC asbestos pipe removal complete • Site characterization planned • On-going communication activities (e.g. School Program)	• Legacy Site Risk Assessment (LSRA) for South West Calgary Ring Road currently being drafted • LSRA for Chiila Phase 1 currently being drafted
Vernon, BC	Total of 20,000 Ha of potentially UXO-affected land resulting from long term military manoeuvre training. There have been 9 confirmed UXO-related deaths since 1944.	• Site characterization completed at Kalamalaka Lake Provincial Park in 2012. • Site characterization planned at Madeline Lake in late February 2013. • Planned site characterization at several sites in 2013 • On-going communication activities	• LSRA's for the Test Pits, HWY 6, and Coldstream Ranch all being drafted
Yekau Lake Practice Bombing Range, AB	Former BCATP site. Site characterisation has identified an impacted zone of potentially 60 Ha located on First Nations Land in a proposed golf course development.	• UXO clearance completed	• RLSRM of MEDIUM in draft

Site Name	Legacy Issue	Activities conducted in 2012 an planned for 2013	Risk Assessment Status
Central/Northern Region			
Churchill, MB	The Churchill area was historically used for live-fire training at multiple ranges.	• On-going communications activities • On-going risk management activities • Shoreline sweeps	• IRAR rating of HIGH • LSRA currently being drafted
Nisutlin Bay Practice Bombing Range, Yukon	Used by the RCAF as a bombing range in the early 1950's	• On-going communications activities	• LSRA currently being drafted
Prince Edward County, ON	Multiple legacy sites with confirmed UXO affected land resulting from BCATP, RCAF, and Army training.	• On-going shoreline sweeps • On-going site characterization • On-going communications activities • Construction support	• RLSRM for Wellers Bay w/ unmitigated risk of MEDIUM and mitigated risk of LOW • RLSRM for Ostrander Pt. in draft form
Scrapyard, Toronto, ON	Former scrapyard that was recently sold for future condo development. During the site clean-up a large quantity of munitions scrap items were discovered 14 December 2012.	• Conducted a surface clearance • Construction support	• IRAR rating of HIGH • LSRA currently being drafted
Shilo, MB	The site of military activity in the region since 1910.	• Communications activities • UXO project requirements development	• IRAR for Spruce Woods with a rating of HIGH • IRAR for Camp Hughes with a rating of HIGH • LSRA currently being drafted
Winisk, ON	RCAF Station Winisk was operational during the 1950s and 1960s. Remnant explosives were identified at the site.	• Working with the CAF to conduct risk mitigation activities to reduce the hazard from the remnant explosives. • Consultation with the Weenusk First Nation. • Utilizing the local Ranger Patrol to provide logistical support. • Development of tasking formal CAF Tasking Order.	• IRAR rating of HIGH • LSRA drafted with a rating of MEDIUM

Site Name	Legacy Issue	Activities conducted in 2012 an planned for 2013	Risk Assessment Status
Quebec Region			
Granby, QC	Former WWII munitions factory, including some munitions testing activities. Munitions debris has been found at the site.	• Communications activities • Completed UXO clearance operation	• IRAR rating of LOW • LSRA currently being drafted
Lac Saint-Pierre, QC	Former munitions testing facility located on the St. Lawrence. One confirmed UXO related death in 1982.	• On-going shoreline sweeps • On-going communications activities • UXO avoidance • Planned UXO clearance operation	• RLSRM w/ unmitigated risk of HIGH and mitigated risk of LOW
Atlantic Region/Underwater			
Albert Head, BC	Former test firing range for artillery and grenade launchers.	• Conducted partial implementation of UXO site characterization	• LSRA currently being drafted
Bay of Fundy, NS	Munitions disposal site in the Bay of Fundy.	• Planned UXO site reacquisition	• No documentation at the moment
Debert, NS	Former Camp Debert housed over 300,000 troops during WWII, and included multiple ranges and training areas.	• Conducted UXO clearance • Conducted UXO avoidance support • On-going UXO risk management activities • Planned UXO site characterization	• IRAR for Belmont Range with a rating of MEDIUM • IRAR for Cobequid Bay with a rating of LOW • IRAR for Colquhoun Range with a rating of HIGH • IRAR for Horse Point with a rating of LOW • IRAR for Main Base with a rating of LOW • IRAR for Spencers Point with a rating of MEDIUM • IRAR for Staples Brook with a rating of MEDIUM • IRAR for Training and Demolition area with a rating of MEDIUM • LSRA for Training and Demolition area with a rating of MEDIUM

Site Name	Legacy Issue	Activities conducted in 2012 an planned for 2013	Risk Assessment Status
Former Tracadie Range, NB	Former military range undergoing review, as previously cleared lands have residual UXO risk.	• On-going risk management	• RLSRM w/ unmitigated risk of HIGH and mitigated risk of LOW
HMCS Thiepval, BC	Battle class converted trawler shipwreck off the coast of British Columbia, with confirmed presence of UXO.	• Planned UXO clearance	• RLSRM w/ unmitigated risk of MEDIUM and mitigated risk of LOW
HMS Raleigh, NL	Cruiser shipwreck off the coast of Newfoundland	• Planned UXO site characterization	• RLSRM for ongoing archeological project, w/ unmitigated risk of LOW with UXO management activities. Overall RLSRM w/ unmitigated risk of HIGH and mitigated risk of LOW
PLM 27, NL	Carrier shipwreck off the coast of Newfoundland.	• Completed UXO site characterization (non-presence of UXO confirmed)	• LSRA currently being drafted
SS City of Vienna, NS	Carrier shipwreck off the coast of Nova Scotia.	• Conducted UXO site characterization (presence of munitions confirmed)	• LSRA currently being drafted
SS Claire Lilley, NS	Munitions transport shipwreck off the coast of Nova Scotia, with confirmed presence of UXO.	• Conducted partial implementation of UXO clearance	• RLSRM w/ unmitigated risk of MEDIUM and mitigated risk of LOW
SS Saganaga, NL	Carrier shipwreck off the coast of Newfoundland.	• Completed UXO site characterization (presence of UXO confirmed) • Planned UXO clearance	• LSRA rating of MEDIUM
USAT BGen Zalinski, BC	Cargo transport shipwreck in the Grenville Channel, British Columbia, with confirmed presence of UXO	• On-going risk management	• LSRA rating of LOW

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Leading Seaman Glen Lewis conducts maintenance on the Close-in Weapons System while Her Majesty's Canadian Ship Charlottetown docks in Salalah, Oman for a port visit while on Operation ARTEMIS on May 30, 2012.