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# AN OPPORTUNITY FOR RENEWAL

DIRECTOR AMMUNITION AND  
EXPLOSIVES REGULATION

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

A REVIEW FROM 1 JANUARY 2007  
TO 31 DECEMBER 2008

Canada

## **The Directorate of Ammunition and Explosives Regulation**

Major-General Georges R. Pearkes Bldg  
101 Col By Dr.  
Ottawa, Ontario K1A 0K2  
Canada

**Tel: 819-997-8674**

**Fax: 819-997-8574**

Defence Information Network Email:  
+ADMMAT DAER-DREM@forces.gc.ca

Defence Information Network Page:  
[http://cosmat.ottawa-hull.mil.ca/daer/  
en/index\\_e.asp](http://cosmat.ottawa-hull.mil.ca/daer/en/index_e.asp)

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## EXECUTIVE SUMMARY

This first annual report by the Director of Ammunition and Explosives Regulation (DAER) provides the DM and CDS an independent analysis of the state of Ammunition and Explosives (A&E) safety in DND/CF for the calendar years 2007 and 2008. The report's main theme focuses on the "*Opportunity for Renewal*" and emphasizes fundamental changes to the Ammunition Program which have the potential to positively transform DND/CF's A&E safety agenda. Moreover, the report provides an update on the rectification of deficiencies noted in the CRS 2005 Evaluation of the DND/CF ammunition safety program.

The annual report covers the main activities of the regulator's office in the areas of compliance, policy development, program transformation, the A&E safety and advocacy program, as well as future program of work.

In the area of compliance, DAER has established a framework emphasizing collaboration and consultation with the various Commands and L1 organisations as the primary means to achieve compliance with A&E safety standards. Formalized reporting lines have been established for data collection and information gathering, DAER participated in various L1 A&E safety-related committees as part of its outreach program, and initial compliance verifications of seven different facilities across five separate L1 organisations were carried out in concert with L1 inspectors.

Key findings from the first round of compliance verifications and data analysis revealed that the A&E safety reporting culture requires significant improvements in order to develop a robust A&E safety program. Reporting of incidents and accidents in both force employment and force generation situations is not commensurate with the present high operational tempo and usage rates for ammunition.

Additionally, there is clear evidence of A&E expertise erosion at all levels, for which there are a number of transformation issues underway to address present deficiencies, including: HR renewal and training initiatives as well as development of terms of reference for key positions as a means to validate required skill sets.

With respect to the life cycle management activities for A&E, there is currently a capability deficiency regarding acceptable disposal methods and demilitarization of A&E at the end of the

life cycle. This is creating logistical hardship to ammunition facilities due to the accumulation of obsolescent and obsolete stocks awaiting final disposal. The ADM(Mat)/CANOSCOM sponsored Demilitarization Capability Project aims to address this void with recognized tight timelines for a capability delivery in 2012.

A national registry of ammunition facility licences has been created; however, there remains significant work to update outdated licences (in the order of 40% of all licences). There are currently two situations requiring further action with respect to unresolved waivers. The first concerns ADM(S&T) and requires resolution of a number of issues raised by DND/CFLA prior to DM/CDS endorsement. The second relates to a waiver situation in Theatre which must be addressed by NATO as the risk cannot be accepted by DND/CF authorities. The respective stakeholders are actively pursuing both issues.

Compliance activities in 2009 and 2010 will concentrate on further investigation of the state of A&E safety programs within the various Commands; survey of the state and capacities of ammunition infrastructure; compliance verification of DND/CF Ammunition Safety and Suitability Board processes; review of the UXO and Legacy sites program processes; as well as further examination of safety issues relating to deployed operations.

Policy development in 2007 and 2008 concentrated on the development of several key DAODs in support of the new regulatory framework, as well as rewriting lower level policies in need of immediate updates. The present A&E policy framework requires significant investments and revision will take years to complete. Focus areas in the next two years will be: to restructure for better coherence the various A&E safety regulations into a series of manuals entitled "Life Cycle Safety"; development of a holistic risk management framework for better management and decision making related to A&E activities; and further development of explosives safety regulations for deployed operations.

A DAER policy verification of ADM(Mat) A&E life-cycle management CFTOs revealed significant deficiencies, both in terms of content and format, including several ammunition natures that are in service without the required technical documentation. Initial steps to resolve the issue have been taken, however full rectification by ADM(Mat) will require several years to complete.

Recognizing that the DND/CF Explosives Safety Program was virtually moribund, the safety and advocacy program was re-launched with a multifaceted approach to re-energizing A&E

safety. Main focus areas included: the rewriting of the main policy publication for accident/incident/malfunction and defect reporting; re-launching the outreach program through the publication of updated posters and development of the DAER DIN site as a communications tool; reviewing and updating explosives safety training; sponsorship of an annual DND/CF A&E safety conference; and providing an analysis capability for ammunition accidents and incidents.

Detailed analysis of 2007 and 2008 data revealed a low incidence of reporting of incidents and accidents, with the exception of CMS. Further it was noted that accidental deaths involving ammunition are not being reported under the Explosives Safety Program, limiting the ability to apply safety program lessons learned. Analysis attributed Human Error as the major cause factor in the majority of occurrences, while very few incidents/accidents were attributable to ammunition or weapon system malfunctions.

Staffing for the development of the business requirement for the Ammunition and Explosives Safety Information Management System (AESIMS) has been initiated to provide the required IM/IT tools for the safety management of the Ammunition Program. It is recognized that this is a fundamental element to enhancing the safety program and to addressing a number of observations from the CRS Evaluation; however progress is being negatively impacted by other high priority IM/IT projects within ADM(Mat). Without the development of AESIMS, safety program enhancements will continue to be constrained by the lack of modern reporting and data collection tools.

Although 2007 and 2008 should be viewed as a transition period, and an initial period of maturation of a new regulatory regime, initial signs indicate that there is potential to significantly advance DND/CF's A&E safety agenda and fully deliver a program, which will minimize potential loss of life and material due to preventable A&E mishaps.

Notwithstanding the need for further program improvement, it is viewed that the present state of A&E safety is such that DND/CF is meeting its obligations under the exemption to the *Explosives Act*.





## INTRODUCTION

The 2005 CRS Evaluation of the DND/CF Ammunition Safety Program<sup>1</sup> constituted a watershed event for the Ammunition and Explosives (A&E) community, bringing to a close a four year review of the ammunition safety program and, at the same time, providing the catalyst for unprecedented change for the safety regulation of A&E activities in DND/CF.

In particular, the evaluation recognized the uniqueness of DND/CF's exemption under the *Explosives Act* and the onus on DND/CF to establish its own regulatory and safety measures for A&E. The CRS Evaluation centred on three fundamental recommendations in order to strengthen ammunition safety in DND/CF:

- ▶ The establishment of an ammunition safety regime based on recognized regulatory principles, including the creation of an independent regulator at the corporate level;
- ▶ Updating, clarifying and promulgating A&E safety policies, standards and related documentation; and
- ▶ The introduction of measures to increase the visibility of, and responsiveness to, potential A&E safety hazards through improved information for decision-making, communications and risk management.

The creation of the Directorate of Ammunition and Explosives Regulation (DAER) as the independent regulator for A&E safety<sup>2</sup> at the corporate level in November 2006<sup>3</sup> is tangible evidence of senior management's resolve to move forward the recommendations of the CRS Evaluation. Upon reaching the initial manning complement of 11 personnel in October 2007, DAER commenced its program of work, simultaneously developing a compliance framework while updating and clarifying policy and re-invigorating the A&E Safety and Advocacy Program.

CANFORGEN 168/06, which effectively activated the new regulatory organisation, also mandated the requirement for an annual report to the DM and CDS on the state of A&E safety in the DND/CF. This is the first of such annual reports and will

<sup>1</sup> 1258-101-2 (CRS) Evaluation of DND/CF Ammunition Safety Program February 2005 – Throughout this report this document will be referred to as “the CRS Evaluation”. It should be noted the CRS Evaluation report referred to the Ammunition Safety Program. The official name of the program actually was “Explosives Safety Program”. In DAOD 3002-3 it was renamed “Ammunition and Explosives Safety Program”.

<sup>2</sup> DAER is located within ADM(Mat) for administrative support and is responsible to the CDS and DM for regulatory matters

<sup>3</sup> CANFORGEN 168/06 ADM(Mat) 006 101044Z Nov 06

*The theme of the first annual report is “An Opportunity for Renewal” and reflects not only recent fundamental changes to the ammunition program with respect to the regulatory oversight – including a direct report to the most senior levels of the Department – but also emphasizes significant changes that are presently taking place in the business in other related areas.*

cover the calendar years 2007 and 2008. In subsequent years, the annual report will cover one calendar year with a target promulgation of 30 April of the year following the review period.

The theme of the first annual report is “An Opportunity for Renewal” and reflects not only recent fundamental changes to the ammunition program with respect to the regulatory oversight – including a direct report to the most senior levels of the Department – but also emphasizes significant changes that are presently taking place in the business in other related areas: from improved governance structure, renewal of the A&E safety and advocacy program to various HR initiatives to ensure program sustainment. For this reason, a section of the report is dedicated to transformation issues in addition to the three main sections of the report which cover the newly established compliance framework, planned policy development as well as the A&E Safety and Advocacy Program.

Although the emphasis of this report is on the present opportunity for renewal, the corollary is that there is much to accomplish for the A&E program to move forward to a point where the recommendations of the CRS Evaluation have been fully implemented. The A&E community and the associated safety program suffered greatly from the program reductions of the 1990s and had not been receiving the required visibility of the senior leadership commensurate with the importance of ammunition to the CF's mission. Furthermore, this opportunity for renewal has coincided with a period of unprecedented activities related to supporting CF troops in combat operations.

To a large extent, these renewal efforts will require leadership involvement at all levels, as well as the necessary investments. The initial steps towards transformation have been taken; however, it will be important for DND/CF to follow through with the various change initiatives which are currently being pursued.

The annual report aims to provide an independent analysis of the present state of the A&E business, an overview of the main activities of the regulator's office, as well as planned activities in the next two year cycle (2009-2010 horizon) to continue moving the A&E regulatory and safety agenda forward. Ultimately, the goal is to ensure that in an ever increasing climate of public expectation of due diligence, the requirements of the CRS Evaluation are met with respect to the management and use of what is one of the most important but inherently hazardous commodities in the DND/CF inventory.



# AMMUNITION AND EXPLOSIVES (A&E) COMPLIANCE FRAMEWORK

## BACKGROUND

One of the eight key recommendations of the CRS Evaluation was for DND/CF to “develop and implement a coherent regulatory framework for ammunition safety founded on sound regulatory principles”. One essential element of a sound regulatory regime and corporate safety program is the ability to exercise sufficient regulatory oversight “to provide assurance that...activities (related to Ammunition and Explosives)...are being conducted safely.” The Canadian public has expectations of due diligence from the Department and the CF, including that a proper compliance program is in place.

In October 2007, DAER reached its initial established manning complement and immediately undertook initial steps to implement a Departmental Regulatory framework for A&E in accordance with DAOD 3002-0. Although considerable effort in DAER’s initial program of work was focused in the areas of policy development and explosives safety program renewal, the prompt implementation of a compliance framework was viewed as essential.

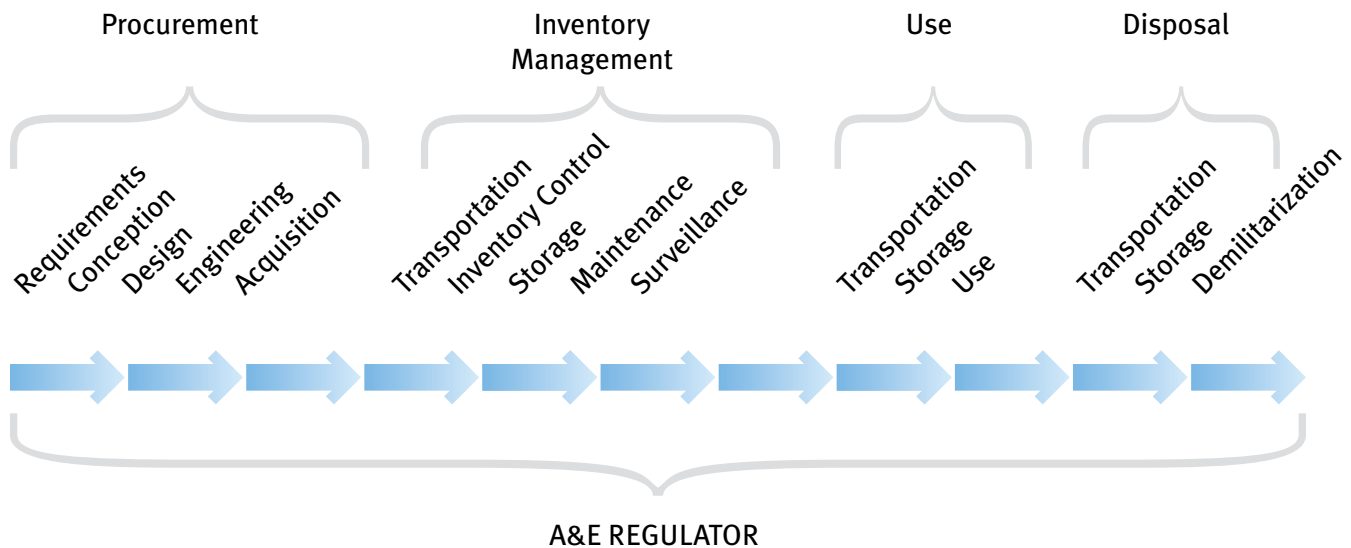
## A&E COMPLIANCE FRAMEWORK CREATION

In order to ensure due diligence by DND/CF under its exemption to both the *Explosives Act* and the *Transportation of Dangerous Goods Act*, and to promote the operational effectiveness of the CF through mitigation of the hazards associated with A&E, a compliance framework was established to provide oversight over the full spectrum of the Ammunition Life Cycle processes, as depicted in Figure 1.

In developing a compliance framework, initial benchmarking was carried out with organizations of similar mandate, both within and external to DND/CF. In particular, the compliance and enforcement program managed by the Explosives Safety & Security Branch of Natural Resources Canada, as well as the application by the Director Technical Airworthiness of audits under the *Aeronautics Act*, were examined.



## Ammunition Life Cycle



**Figure 1 Life Cycle of Ammunition and Explosives**

In the end, a compliance framework centered on a consultative and collaborative approach with L1s, Environmental and Operational Commands was viewed as the appropriate mechanism to promote awareness of A&E safety issues and to implement mitigation strategies to address non-compliant situations. Although the newly established regulatory structure allows direct access by DAER to Commanders at all levels, including the DM and CDS, the aim is to resolve observations at the lowest level possible, while providing visibility to the Chain of Command on those issues which require leadership awareness and/or intervention.

Visibility of DND/CF A&E related activities through formalized reporting and data collection was structured around two key processes:

► **Passive Data Collection (PDC):** The activity of collecting data on A&E processes and capabilities from established reporting mechanisms. In order to achieve the required level of information on A&E safety related issues, data collection and tracking tools were created. For 2007 and 2008, these covered the following reporting areas:

- A&E accidents and incidents;
- Explosive Ordnance Disposal (EOD) activities;
- Command inspection results related to A&E activities and facilities;

- Ammunition storage facility licensing; and
- Deliberations of ammunition-related executive committees and boards: DND/CF Ammunition Board; Ammunition Suitability and Serviceability Board (ASSB); UXO Working Group; Explosive Risk Rating Sub-Committee (XRRSC) and CF/EOD Working Group.

► **Active Data Collection (ADC):** The activity of purposely seeking data on A&E processes by sending DAER representatives to monitor specific activities and processes. This can take the form of compliance verifications, investigations or participation in domestic Level 1 forums relating to A&E safety (e.g. Maritime Ammunition Working Group (MAWG)).

Figure 2 depicts the complexity of the A&E landscape and shows the various L1 organizations, operational and environmental commands as well as external stakeholders with whom DAER must interface in executing its program of work. Prior to implementing ADC in such a complex and diversified environment, DAER conducted an extensive communications/liaison campaign. This effort was also an important component of the new Directorate's Communication Strategy. L1 "buy-in" to the ADC initiative was perceived as essential: their response to the compliance ADC mandate was positive and supportive.

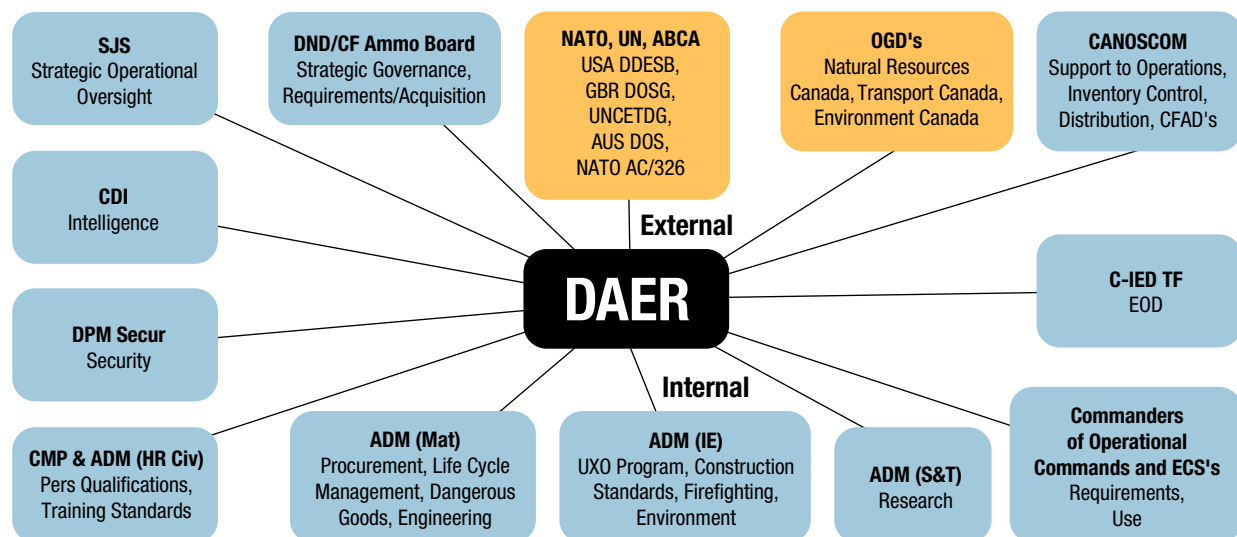


Figure 2 Working Relationships

### A&E COMPLIANCE PROGRAM OF WORK IN 2007 AND 2008

Considering the wide spectrum of processes associated with the Life Cycle Management of Ammunition (Figure 1), it was essential to limit the scope of the first ADC cycle. The initial focus was clearly stated in DAER's original intent letter to L1s of Oct 07<sup>1</sup>: "to carry out baseline survey of existing practices, to allow for a grassroots account from Command inspectors on the adequacy of the present approach as well as from the units being inspected".

The self-constrained ADC scope took into account current organizational shortfalls in the area of engineering expertise, a capability gap to be rectified in 2009 through Business Planned spiral growth for DAER. The evaluation of the inspection process specified in Ammunition and Explosives Safety Manual Volume 1 (C-09-153-001/TS-000) provided the opportunity to observe Commands' best field practices, as well as to observe and discuss their problems/issues. ADC visits were conducted as shown in Figure 3.

L1 Organization	Unit	Dates of Verification
CMS	JTF(A) Halifax	19-21 Nov 07
CLS	3 ASG Gagetown	19-21 Feb 08
CAS	8 Wing Trenton	11-13 Mar 08
CAS	4 Wing Cold Lake	26-28 Aug 08
CLS	CFB Wainwright	23-26 Sep 08
ADM(S&T)	DRDC Suffield	20-24 Oct 08
CANOSCOM/CMSG	CFAD Rocky Point	24-27 Nov 08

Figure 3 Active Data Collection 2007 and 2008

Key findings of the first year of ADC/PDC activities can be summarized as follows:

- ▶ **Culture of Reporting.** The Culture of A&E Safety Reporting across the CF requires significant promotion, enhancement and improvement. This aspect will be addressed in more detail in Section 4 (A&E Safety and Advocacy Program), with particular emphasis on data collection and analysis, an evaluation of the current A&E Safety Advocacy program, and increased leadership engagement;
- ▶ **Facility Inspection Process.** The A&E Facility Inspection Process, as conducted by Commands, is healthy. The Public expectation of due diligence is well served by the current Command Inspection process. Some minor improvements to policies will be incorporated based on best practices observed during ADC visits;
- ▶ **Erosion of Expertise.** An erosion of A&E expertise in the DND/CF: The gaps created in the 90s with the Force Reduction Programs, and trade amalgamation initiatives have resulted in capability and expertise shortfalls in the environmental and operational command headquarters, as well as at unit level. Related issues will be discussed further in the Transformation section of the report (Section 5);
- ▶ **Terms of Reference (TOR).** TOR of key ammunition positions are outdated or simply non-existent. This observation, which correlates with Theme 8 findings of the CRS Evaluation, is clearly linked to the previous “expertise erosion” theme and will also be discussed under A&E Transformation (Section 5);
- ▶ **Publications.** Ammunition related Canadian Forces Technical Orders (CFTO) and publications, predominantly in ADM(Mat), are outdated and in some cases non-existent. This deficiency, which correlates with CRS Evaluation Theme 2 findings, represents a major source of risk, both to the Program and to personnel. This deficiency is further amplified in Section 3 (A&E Policy Framework);
- ▶ **Demilitarization.** The lack of domestic demilitarization capability for A&E is creating logistical hardship to ammunition facilities and contributing to increased risk. Fuelled by environmental concerns, the 2003 moratorium<sup>2</sup> (with some exceptions) on open burning or detonation has aggravated the stockpile of ammunition and scrap awaiting disposal. Currently, 2,000 tons of munitions scrap and non-munitions scrap collected from clearances of CF ranges and legacy sites, 5,000 tons of deteriorated and unserviceable ammunition with no operational or training value, and 10,000 tons of obsolescent ammunition are being stored pending disposal. The already difficult situation is expected to worsen with the return of munitions upon closure of the Afghanistan mission. ADM(Mat)/DAEME and CANOSCOM/J4 Ammunition are jointly managing a project (SSID approved in May 2006, options analysis completed end 2008) to equip the CF with a full demilitarization capability by 2012. Senior Review Board (SRB) review is planned for spring 2009. DAER will continue to monitor progress of this very tight project timetable;
- ▶ **Munitions Scrap.** Munitions Scrap held by civilian contractors continues to expose the public to potential risk. Civilian fatalities in 1983 and 1997 led to a moratorium<sup>3</sup> on the sale of munitions scrap to civilian contractors. Despite major efforts at the time to capture and dispose of all munitions scrap previously sold through Crown Assets Disposal, munitions scrap continues to appear in scrap yards, as demonstrated by the Lethbridge, Regina and Petawawa incidents of 2007 and 2008. DAER will continue to monitor the situation in concert with ADM(IE)/DND UXO and Legacy Sites Program, as well as reviewing, from a policy perspective, the processes associated with the screening of munitions scrap;
- ▶ **Licensing Process.** The licensing and waiver process for A&E Storage prescribed in A&E Instruction 03/07 (A&EI 03/07) reflects past practice and requires a comprehensive review to align it with the risk management and acceptance framework being developed in concert with CFLA. Currently there is one Category A waiver regarding ADM(S&T), which is pending final legal review prior to DM/CDS signature, and one expired Category A waiver for a Forward Operating Base (FOB), which must be staffed by CEFCON;

<sup>2</sup> Ammunition Directive 2-03, dated 19 Aug 03, superseded by A&EI 11.

<sup>3</sup> CANFORGEN 119/99, 21 Dec 99, Munitions Scrap from Range Clearances.



- ▶ **Licensing Backlog.** A significant licence review/renewal backlog of Ammunition facilities exists. Prior to the creation of DAER, a licensing moratorium was in effect. This was lifted when DAER promulgated A&EI 03/07. Licences are normally reviewed on a five year cycle to ascertain if conditions under which the licence was granted have changed. More than 40% (163 of 386) of current licences require L1 review and approval. L1 staffs are actively working in cooperation with DAER towards resolving this situation; and
- ▶ **Deployed Operations.** There have been marked safety improvements relating to A&E Storage in Theatre at the TN ASP (Tri-National Ammunition Supply Point). CEFCOM, with the support of CANOSCOM, has carried out a re-warehousing, reduced holdings, and completed a barricade construction project in order to meet, to the greatest extent possible, the prescribed Quantity Distance (QD) requirements of National and NATO standards. Despite efforts by CEFCOM and CANOSCOM, there is still a waiver situation affecting 10 Potential Explosive Sites (PES) which would necessitate a Category A Waiver, if domestic regulations were applied. The Chain of Command has received the required visibility of the related issues<sup>4</sup>. Legal advice has been obtained from the office of the JAG and DND/CF LA. As the TN ASP is a jointly operated facility in a NATO led operation, domestic regulations do not apply. Accordingly, rather than seeking waivers from the CDS/DM, waiver applications will be staffed to the appropriate operational commander for decision in accordance with the NATO policy manual. DAER has made representations to the CNAD Ammunition Safety Group (AC/326) - responsible for the formulation of NATO A&E Safety principles - on the need to further advance NATO led solutions for safety issues in Theatre<sup>5</sup> and will continue pursuing this issue for a longer term resolution.

<sup>4</sup> DAER Briefing to Defence Executive Meeting 08 Feb 08; DAER Meeting with COS CEFCOM 13 Mar 08.

<sup>5</sup> This issue was raised by CAN at the 12<sup>th</sup> meeting of the CNAD Ammunition Safety Group Meeting, 04-05 Dec 08. PFP(AC/326)DS(2008)0002 09 Dec 08 refers.



## A&E COMPLIANCE PROGRAM OF WORK IN 2009 AND 2010

DAER has designed a Compliance Program of Work for the 2009-2010 timeframe to include the following ADC focus areas:

- ▶ **Safety Program.** The implementation of the A&E Safety Program, as laid out in A-GG-040-006/AG-001 DND Explosive Safety Program, at the Unit, Base and Command levels;
- ▶ **Infrastructure Survey.** A survey of the state and capacities of DND/CF Ammunition Infrastructure, to be conducted in conjunction with ADM(IE) and responsible Commands;
- ▶ **Safety and Suitability.** The Ammunition Safety and Suitability Board (ASSB) is tasked with providing L1 authorities with an impartial appraisal of munition safety and suitability for their declared service environment and operating parameters. The ASSB bases its findings on a series of detailed, systematic review processes. Functioning primarily within the project management process, the ASSB forms one of the cornerstones of the DND/CF Explosives Safety Program. A detailed analysis is required to validate whether process obligations have been appropriately assigned and properly resourced to meet current and future task loads;
- ▶ **Life Cycle Management.** A review of Munitions Life Cycle Management processes, in concert with ADM(Mat)/DAEME and CANOSCOM/J4 Ammunition;
- ▶ **Ammunition Surveillance.** A comprehensive review of the Ammunition Surveillance program, in concert with ADM(Mat)/DAEME;
- ▶ **UXO and Legacy Sites.** A review of DND UXO and Legacy Sites processes and activities, with the support of ADM(IE);
- ▶ **Operations.** A review of Ammunition policies in a Theatre of Operation (Forward Operating Bases; Basic Load Ammunition Holding Areas), in concert with CANOSCOM/J4 Ammunition, to include an action plan for disposition of ammunition in-theatre; and
- ▶ **Demilitarization.** Monitoring of the progress of the Demilitarization Project.

## SUMMARY

In conclusion, the A&E compliance framework was advanced with the cooperation and support of L1s. While much work is still needed to provide final resolution of some observations of the CRS Evaluation, the overall assessment is that significant progress towards the required end-state has been made. L1 consultation and contributions will continue to be solicited in addressing key compliance findings of this report.



# AMMUNITION AND EXPLOSIVES POLICY FRAMEWORK

## BACKGROUND

A&E policies, procedures and regulatory processes are necessary to ensure safe and effective day-to-day operations involving these inherently hazardous commodities which are utilized by various L1s, environmental and operational commands, both domestically and abroad. A robust policy framework is particularly important considering that – despite its exemption under the provisions of the *Explosives Act* – DND/CF is fully committed to complying whenever possible with legislation, upholding public safety and well being, be it at the federal, provincial or municipal level. Moreover, DND/CF compliance with the *Explosives Act* and relevant Regulations serves the purpose of providing a safe and secure environment, ensuring that A&E remains a key enabler to CF operational capability rather than becoming a liability. Self-regulation becomes the key guarantor of that pledge and a key means of addressing public expectation for due diligence.

Notwithstanding its importance, the current state of the A&E policy framework is such that it is in need of significant renewal. The CRS Evaluation emphasized that an appropriate policy framework was not in place for ammunition safety. It also indicated that incomplete, outdated policies and guidance documentation had the potential to reduce ammunition safety, delay defence acquisition projects, and increase the risk of legal liability. The same report strongly expressed the explicit need to:

- ▶ Update, clarify, and promulgate ammunition safety policies, standards and procedures and related documentation;
- ▶ Consult with the stakeholders and obtain their inputs to ensure their understanding of the intended policy; and
- ▶ Ensure that A&E policies are and will remain current.

Considering that the essence of an effective policy framework is currency, relevancy to operations and conformity with other policies, in the first 24 months DAER's policy development focus has been to concurrently review key documents, to establish procedures and to begin work on overcoming critical deficiencies by:

- ▶ Reviewing Departmental policy requiring immediate renewal;
- ▶ Working collaboratively on critical, immediate amendments while concurrently progressing longer term rewrites;
- ▶ Establishing Ammunition and Explosives Instructions (A&EIs) to ensure the expeditious dissemination of critical Life Cycle and safety-related information;
- ▶ Appraising the currency of secondary policy documentation that affects A&E throughout its life cycle, from acquisition to disposal; and
- ▶ Working collaboratively with L1s to ensure that projected policy changes support and enable their priority work.

#### A&E POLICY PROGRAM OF WORK IN 2007 AND 2008

DAER's A&E policy program of work in 2007-2008 focused on the development and publishing of foundation DAODs required in the establishment of the regulatory regime, as well as the re-writing of several key second tier publications. In collaboration with various DND/CF stakeholders, particularly with CLS/CF EOD and ADM(IE)/DND UXO and Legacy Sites Program, a number of top level policies were established, including minimum qualification standards for A&E practitioners and contractors, predominantly through DAER participation in key A&E committees.

Figure 4 illustrates DAER's major accomplishments in the area of policy development during the last 24 months.

Document/Subject/Theme	Brief Description
DAOD 3002-0 Ammunition and Explosives	Amended to update policy authorities and established DAER as the regulating agency
DAOD 3002-3 Ammunition and Explosives Safety Program	A new order and directive outlining the A&E Safety Program and associated responsibilities
DAOD 3002-4 Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting	A new order and directive establishing responsibilities for reporting
DOAD 3002-5 Firearms, Ammunition and Explosives	A new order and directive amalgamating several CFAOs with respect to use and authority related to Small Arms and Small Arms Ammunition
CANFORGEN 090/07 DAER 001/07 171507Z MAY 07	Regulation of local procurement of ammunition, explosives and related accessories
A-GG-040-006/AG-002 DND Ammunition Explosives Accident/Incident/Defect/ Malfunction Reporting	Complements the policies and procedures contained in DAOD 3002-4, Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting
C-09-153-003-TS-000 Explosives Safety Manual, Volume 3 – Naval Vessels	Minimum safety standards for A&E and related stowage spaces in HMC Naval Vessels
A&EI 6 Removal of Hard Targets From CF Ranges and Training Areas	Major undertaking in support of all L1s for safely removing targets from ranges
DND/CF UXO and Legacy Sites Program	Key policy development: Participation in development of TOR for the Explosives Risk Rating Sub-committee Participation in development of Standard 01/2008 – Technical Instruction for DND/CF UXO Activities Publication of civilian standards for UXO practitioners, including expiry criteria Formal recognition of civilian training institutions for UXO practitioners (University of Tennessee and Texas A&M)
CF EOD	Review and coordination of A&E aspects of DAOD 8000-0 Explosive Ordnance Disposal and DAOD 8000-1 Explosive Ordnance Disposal Instruction

**Figure 4 DAER Policy Program of Work 2007-2008, Main Accomplishments**

## AN OPPORTUNITY FOR RENEWAL

Annex A provides a summary of the current state of the major publications related to the life-cycle of A&E. Specific areas of concern are detailed further below:

### ► In areas where policy does not exist (Red in Annex A):

- **Risk Management.** As stated in the CRS Evaluation, there is a need to strengthen the capability and procedures for performing risk assessment. The A&E Program needs a structured approach to managing uncertainty throughout the entire A&E life cycle (holistic approach);
- **Explosive Safety Regulations for Deployed Operations.** Current A&E regulations are predominantly based on domestic requirements for safety and have proved difficult to adapt to deployed operations. A top DAER priority has been the development of deployed operations safety regulations, based on agreed NATO standards. Canada has been a major contributor to AASTP-5, NATO Guidelines for the Storage, Maintenance and Transport of Ammunition on Deployed Missions or Operations, which will soon be promulgated; and
- **Demilitarization Policy.** There is currently no established demilitarization policy. As a demilitarisation capability is established through the joint ADM(Mat)/CANOSCOM Capability Acquisition Project, there will be a requirement to develop related policies and procedures.

### ► Areas where policy exists, however substantial revision and/or clarification is required (Yellow in Annex A):

- **C-09-153-001/TS-000 A&E Safety Manual, Volume 1, Storage and Transportation.** Currently the core A&E program document, this manual is outdated in many areas and has suffered significantly from additions outside of its intended scope. Since this publication is the standard for all domestic storage and transportation and is extensively

used as a daily reference by the A&E community, it is essential that it be reviewed and amended with today's best practices, while ensuring that its content reflects NATO standards. Additionally, responsibility for ownership of topics that are outside the scope of this manual must be reassigned to the appropriate manuals or publications; and

- **A&E Technical Orders.** Twenty years of re-organization, re-engineering and personnel reductions have had many deleterious effects. Overall quality and consistency of ammunition-related CFTOs requires improvement. Some are incomplete (e.g. AIM-120 AMRAAM is missing service conditions recommended by the ASSB and approved by CAS); some are non-existent (e.g. there are no documented CFTOs for the Harpoon Anti-ship Missile). Some CFTOs have become 'orphaned' as organizations and responsibilities have changed. Inadequate access to technical information by maintenance, logistics, and operations personnel significantly increases the possibility for damage to equipment, creates potentially unsafe handling environments, and hinders operational effectiveness. While the vast majority of the A&E CFTOs are owned by DGLEPM/DAEME, the issue of content and format has also been noted within the other EPMs. DAEME has begun action to resolve this issue, but it will take years to complete as there are in excess of 250 CFTOs.

Following the initial review of the state of A&E policy, it was decided that a restructuring was required to provide better coherence and mapping of policy to all phases of the A&E life cycle. In particular, it was decided that an over-arching publication titled "Ammunition and Explosives Manual – Life Cycle Safety" was needed as the central repository for top level A&E policy. This document will then be supported by a series of topic specific procedural manuals as outlined in Figure 5.

Items	Proposed Content
<b>Volume 0</b> Life Cycle Safety	<ul style="list-style-type: none"> <li>• A&amp;E Program Governance Scheme</li> <li>• A&amp;E System Of Classification And Compatibility Grouping</li> <li>• Life Cycle Risk Assessment Process</li> <li>• A&amp;E Safety Program</li> <li>• Ammunition Board Terms Of Reference</li> <li>• ASSB Terms Of Reference</li> <li>• A&amp;E Practitioners Terms Of Reference</li> <li>• A&amp;E Personnel Training And Qualification</li> <li>• A&amp;E Security</li> </ul>



Items	Proposed Content
<b>Volume 1</b> Storage	<ul style="list-style-type: none"> <li>• Authorized Structures, Lockers, Ready-Use Cases, And Containment Vessels</li> <li>• Site Certification, Licensing And Inspection</li> <li>• Revised NEQ Tables</li> <li>• Other Hazard Divisions Co-Location Matrix</li> <li>• A&amp;E Control And Handling</li> <li>• Emergency Response</li> </ul>
<b>Volume 2</b> Transportation	<ul style="list-style-type: none"> <li>• Authorized Vehicle And Vessel Configurations</li> <li>• Route Control And Limitations</li> <li>• Tracking And Emergency Response</li> <li>• Maximum Credible Event Load Limitation</li> <li>• Load Verification And Security Seals</li> </ul>
<b>Volume 3</b> Naval Vessels	<ul style="list-style-type: none"> <li>• Duties And Responsibilities Of Ships' Staff</li> <li>• Certification, Inspection And Control Of Ships' Magazines And Lockers</li> <li>• Certification And Control Of Naval A&amp;E Handling Equipment</li> <li>• Other Hazard Divisions Co-Location Matrix</li> <li>• A&amp;E Control And Handling</li> <li>• Emergency Response</li> <li>• Design Instructions For Magazines And Lockers Including Fire Suppression, Flooding, Electrical And HVAC Systems</li> </ul>
<b>Volume 4</b> Hazards of Electromagnetic Effects	<ul style="list-style-type: none"> <li>• Hazards Of Electromagnetic Radiation To Ordnance</li> <li>• Hazards Of Electrostatic Discharge To Ordnance</li> <li>• Hazards Of Lightning To Ordnance</li> <li>• Radio Frequency Identification Tagging In Proximity To Ordnance</li> </ul>
<b>Volume 5</b> Deployed Operations	<ul style="list-style-type: none"> <li>• Application Of AASTP-5 Allied Guidelines For The Storage, Maintenance, And Transport Of Ammunition On Deployed Missions Or Operations</li> <li>• Lessons Learned</li> </ul>

**Figure 5 C-09-153 Ammunition and Explosives Manual Series**

#### **A&E POLICY PROGRAM OF WORK IN 2009 AND 2010.**

Figure 6 displays the projects to be accomplished during this period, identified in three distinct categories:

► **Creation.** New policy, procedure and regulatory process requirements that need to be drafted and circulated for feedback;

► **Review.** Policies, procedures and regulatory processes that currently exist, but need to be reviewed for currency and accuracy; and

► **Monitoring.** Current policies, procedures and regulatory processes requiring DAER's attention and involvement.

Categories	Item	Remarks
Creation	Volume 0 - A&E Life Cycle Safety	Risk Management framework, Ammunition Program governance, Explosive Safety Program, Training/qualifications/recertification, security
	Volume 1 - Storage	Structure and scope Building standards, new NEQ tables
	Volume 5 - Deployed Operations	Initial development based on lessons learned and usage of draft AASTP-5 in theatre
Review	A&E Storage Licensing	Review of waiver policy Review of small lockups
	DAOD 3002-1 Certification of Ammunition and Explosives	Review of scope
	DAOD 3002-2 Insensitive Munitions	Review of scope
	Hazards of Electromagnetic Radiation to Ordnance (HERO)	Modernization and integration with RF Safety program
	CFAO 36-51 Fireworks Displays	Conversion to a DAOD
	Plain language amendments to Explosives Act Regulations	Clarification of DND exemption under the Act
	C-09-008-001/FP-000 Destruction Of Surplus, Obsolete And Deteriorated Ammunition	
	Ammunition Safety and Suitability Board (ASSB)	Scope, authority and function
Monitoring	NABCO vessels for explosion containment	
	CF EOD DAODs	
	Clearance of vehicles in theatre	Monitor current theatre SOPs
	Civilian qualifications - Expiry for UXO	Review individuals' qualifications for UXO work.
	Demilitarization	Monitor progress of the acquisition of a capability, and NATO's work on the subject
	Volume 3 - Naval Vessels	

Figure 6 A&E Policy Program of Work in 2009 and 2010

The emphasis of the projects listed in Figure 6 will be as follows:

- ▶ **Risk Management.** There is a need to strengthen the capability and procedures for performing risk assessment. The A&E program requires a structured approach to managing uncertainty with respect to any A&E-related risk to personnel and materiel in any portion of the life cycle of A&E. Consequently an over-arching risk assessment process will be articulated which can be applied to any A&E activity. This will be based upon the five accepted steps in any risk assessment process: hazard identification; threat assessment; control plan; approval and acceptance; and, tracking. It will include a formal, mandated process which will summarize the five steps and serve as an official record. The aspects of CF/DND operations that will initially be targeted to implement use of the process are: range and training safety, UXO and Legacy Sites Program, Safety and Suitability for Service, and Licensing for storage;
- ▶ **Transportation, Storage and Use of A&E on Deployed Operations.** Large in-theatre A&E stocks are vital to sustaining combat operations; however, excessive or improperly stored A&E stocks create the potential for disastrous accidents. Therefore, A&E policies, standards and procedures must address the realities of deployed operations, while maintaining the maximum level of safety reasonably possible in any particular circumstance;
- ▶ **Ammunition Safety and Suitability Board (ASSB).** The ASSB is entrusted with the responsibility of ensuring that all A&E proposed for DND/CF service undergoes an impartial appraisal of its potential safety and suitability for use in a Canadian service environment. This is one of the cornerstones of the DND/CF Explosives Safety Program. As such, it is vital that this process be re-examined regularly to ensure that it remains responsive to operational requirements, while not compromising its independence and mandate due to exterior pressures; and
- ▶ **Networking.** In addition to the specific tasks mentioned in Figure 6, DAER will continue to work closely with other experts within the international community, and to attend and actively participate at international seminars and conferences, thereby enabling DND/CF to have access to the latest technologies and best practices employed by our allies and industry. This is essential to the development of future A&E policies, procedures, and processes. Ongoing activities in this area include: active participation at the NATO CNAD Ammunition Safety Group (CASG AC/326); bilateral arrangements with the Department of Defense Explosives Safety Board (DDESB); a close working relationship with Australia's Directorate of Ordnance Safety (including a renewal of the

project charter with the Australian Ministry of Defence on standard assessment of the safety and suitability for service of A&E; and regular meetings for information exchange with the Explosives Safety and Security Branch of Natural Resources Canada (NRCAN).

## SUMMARY

The creation of DAER has reaffirmed that the DND/CF is committed to a corporate safety program approach to ensure compliance with the *Explosives Act* and to ensure it is exercising due diligence in its duty of care for public safety. Having been delegated the authority and responsibility to regulate A&E on behalf of the DND/CF, the focus in the last 24 months has been two-fold:

- ▶ Setting the foundation of a comprehensive policy framework in response to the recommendations of the CRS Evaluation by:
  - Reaching out to key L1 stakeholders;
  - Raising awareness of the A&E regulations;
  - Renewing and creating of strategic partnerships with NRCAN, the USA, Australia and the NATO Group of Experts; and
  - Reviewing key policies, processes and procedures for currency and clarity.
- ▶ A structural review of core publications in order to identify gaps in documentation and propose a realignment to enhance coherence with the life cycle for A&E.

Despite these key initiatives and accomplishments, much remains to be done. In the next two years, the focus will be to address key policy deficiencies. Top-level publications will be written or restructured and updated in order to become the bedrock of the policy framework. Fundamental reviews of existing documents will be undertaken to update and clarify A&E policies. Additionally, efforts will continue to monitor the development of on-going initiatives associated with A&E, such as the UXO and Legacy Sites Program, the CF EOD activities and publications like Maritime Command Order 46-8. Continuing support from external partnerships and the involvement of the key L1 stakeholders will be crucial to ensuring the success of policy reform and renewal endeavours.



# AMMUNITION AND EXPLOSIVES SAFETY ADVOCACY AND ANALYSIS

## BACKGROUND

Although the 1994 CRS Evaluation of the Ammunition Program<sup>1</sup> did not find significant fault with the Explosives Safety Program, the subsequent 2005 CRS Evaluation was significantly more critical, concluding that: “certain elements of a sound regulatory regime and corporate safety program are either missing or required further improvement”. Furthermore, it was the CRS view that: “regulatory oversight is not currently sufficient to assure that ammunition activities were being conducted safely”.

The 2005 CRS Evaluation further concluded: “In order to make informed program decisions, improvements are needed in the collection, analysis, and dissemination of ammunition safety information. Good information and analysis are needed in order to identify and mitigate safety problems and therefore are essential for proactive safety management and regulation.”

The CRS Evaluation also recommended “Measures to increase the visibility of, and responsiveness to, potential ammunition safety hazards through improved information for decision-making, communications, and risk management”.

Recognizing that the Explosives Safety Program was virtually moribund, a Safety Advocacy and Analysis cell was established in DAER to renew and manage the DND/CF Explosives Safety Program and to assume the following responsibilities:

- ▶ OPI for the A-GG-040-006/AG-001 DND Explosives Safety Program publication;
- ▶ In its advocacy role, the management of the DND/CF outreach program to promote explosives safety education and awareness;
- ▶ Sponsorship of explosives safety training;

<sup>1</sup> NDHQ 1258-101 (DGPE) NDHQ Program Evaluation E1/93 “The DND Ammunition Program” dated 23 November 1994



- ▶ Sponsorship of the Annual DND/CF Ammunition and Explosives Safety Conference;
- ▶ Management of the DAER DIN site; and
- ▶ Analysis of, and lessons learned from, ammunition accidents and incidents.

### A&E SAFETY AND ADVOCACY PROGRAM OF WORK IN 2007 AND 2008

The renewal of the Explosives Safety Program was based on the two pillars of Advocacy<sup>2</sup> and Analysis<sup>3</sup>. In its initial program of work, DAER concentrated mostly on the revision of the manual on reporting of accidents and incidents, as well as on training at unit level, as described in the following paragraphs.

**Policy Revision.** An immediate priority was the rewriting of A-GG-040-006/AG-002 DND Ammunition Accident/ Incident/Defect/Malfunction Reporting in order to update the organizational structure, to clarify responsibilities, and to comply with DND Health and Safety Council direction that investigators working under the auspices of health and safety programs be appropriately qualified. In addition, the re-release of the manual added impetus for Level 1s to review and renew their reporting processes. The Program was renamed the “Ammunition and Explosives Safety Program” to more clearly delineate the scope and to signal change. The actual reporting system, though outdated, was not upgraded as the necessary information management tools were not in place. Reporting system changes will be discussed under Transformation Issues (Section 5).

**Courses for Unit Personnel.** Unit requirements for qualified personnel to receive, store, issue and return ammunition were, in theory, being met through the Basic Explosives Safety Course. However, this course had not been properly developed and documented, and throughput requirements were never being met. A formal training review was conducted. The course was renamed “Unit Ammunition Representative (UAR) Course” to cater for the expanded focus. While the DND Explosives Safety Program policy required all commanding officers to appoint a Unit Explosives Safety Officer (UESO), UESOs were not being trained and were not being supported with appropriate tools. A new UESO Course is being developed, with planned delivery in the 2009/2010 timeframe.

DAER has entered into a formal CDA project to develop the UAR and UESO Courses for delivery by Distance Learning (DL). The Project Charter was signed in September 2008<sup>4</sup>. Priority for DL development is the UAR Course. Once this course is delivered and throughput/accessibility is no longer an issue, it will become a mandatory unit qualification.

**Communication and Outreach.** To support explosives safety education at unit level, the explosives safety poster campaign was reinvigorated. The poster inventory was culled, central distribution through the Publications Depot re-established, and new posters are currently under development. To complement the poster campaign and facilitate unit level education, two new initiatives are underway: a bulletin format (essentially a Directorate generated poster) is being developed, and a series of topical presentations (termed vignettes), designed to be delivered at unit level will be distributed through the DAER DIN site. Posters, bulletins and vignettes all draw upon lessons learned from analysis of ammunition accidents and incidents and inputs from environmental commands.

**The DAER DIN.** This portal has been developed as a principal communication tool. It is designed as a one stop location for information related to ammunition and explosives catering, not just for the A&E community, but for DND/CF. Services provided elsewhere on the DIN are not duplicated. Links are used to connect external sources with DAER’s official storage site of A&E related manuals and directives. The DIN site also functions as a supplementary mean of communication for the timely release of amended regulations and instructions. It is the principal method of distributing new vignettes, bulletins, articles, etc, and provides an interface for the ordering of DAER products, such as posters.

**DAER Annual Ammunition and Explosives Safety Conference (AESC).** This conference, open to the entire DND/CF A&E community, was developed as the primary forum in which to discuss national A&E safety issues. The 2nd Annual AESC was conducted in Ottawa 18-20 November 2008, with participation of more than 80 personnel from all ECS and relevant Level 1s. A theme for the conference was introduced for the first time: “The Culture of Reporting”. The theme choice provided ample opportunities for discussion and exchange on how to improve and promote this fundamental facet of the AESP. The 2nd Annual AESC also pointed out the poor state of reporting, at least in relation to such programs as Flight Safety. The conference was instrumental in developing DAER’s 2009 Program of Work.

<sup>2</sup> From Wiktionary; Advocacy: the act of arguing in favour of, or supporting something; the practice of supporting someone to make their voice heard

<sup>3</sup> From Wiktionary; Analysis: (countable and uncountable; plural analyses) The action of taking something apart in order to study it; (logic) Proof by deduction from known truths.

<sup>4</sup> CDA 1969-1 (SSO LCE) 24 September 2008

## SUMMARY OF 2007 AND 2008 ACCIDENT AND INCIDENT ANALYSES

Detailed annual analyses for 2007 and 2008 are attached as Annexes B and C. Along with the analyses are summarized lists of accidents and incidents from which unit information has been excluded in order to avoid singling out specific organisations. The summaries have been included to promote dialogue down to the unit level and to illustrate the potential seriousness of any incident or accident involving A&E.

The following graphs provide a trend analysis for reported occurrences (accidents and incidents) during the past eight years as well as reported injuries and deaths.

### OCCURRENCES

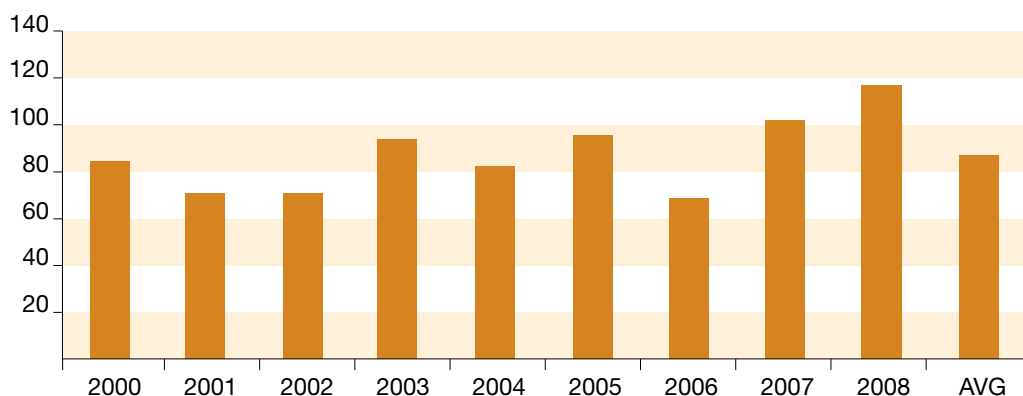


Figure 7 Occurrences 2000-2008

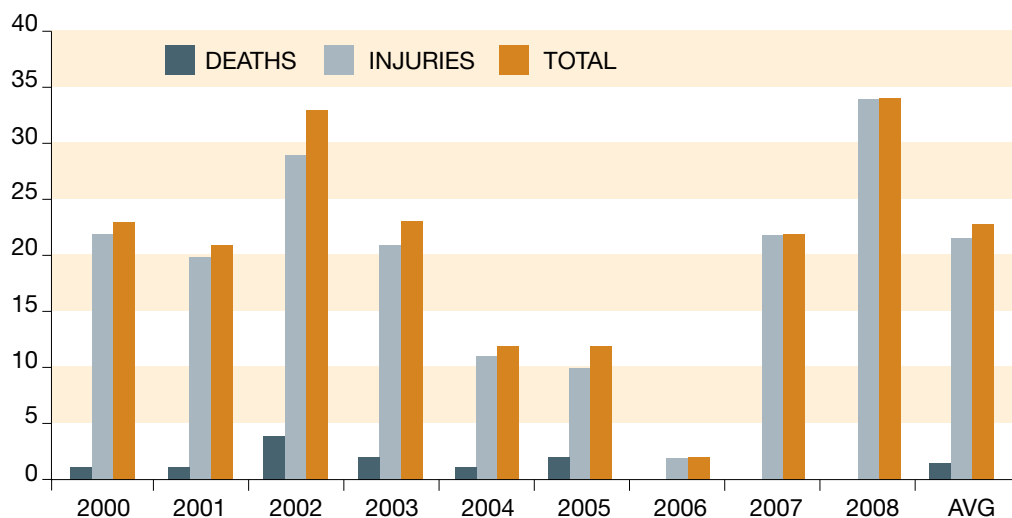


Figure 8 Injuries and Deaths 2000-2008

▶ Although there is a noted increase in the number of occurrences in both 2007 and 2008 in comparison to the 8 year average (23% and 35% respectively), there is nevertheless an increasing concern that a significant amount of occurrences are not being reported. In particular the following should be noted with respect to 2007/2008 circumstances:

- Strict adherence to reporting of A&E incidents by CMS units is masking the lower reporting rates by other environmental and operational commands;
- There is a low incidence of reporting by the environmental commands engaged in Force Generation activities, in particular CLS; despite a very high training tempo;

- There have been very few incidents or accidents reported by CMP despite a very high training tempo;
- There have been no accidental discharges reported in Theatre under the AESP; and
- Accidental deaths involving ammunition are not being reported under the AESP, which is limiting the ability to apply any lessons learned from a safety program perspective.

▶ “Human Error” was attributed as the cause factor for the majority of occurrences in the last two years (59% in 2007 and 82% in 2008). The majority are unintentional but there were several deliberate violations of regulations;

▶ A significant number of occurrences were attributed to ‘Other Undefined Causes’, which does not lend itself to meaningful analysis. More work will be undertaken by DAER to develop a satisfactory cause attribution system in order to provide meaningful data; and

▶ In general, the ammunition inventory is functioning as designed which tends to validate the Departmental Ammunition

Safety and Suitability assessment process. Few accidents or incidents were caused by a failure of the ammunition. A small number of occurrences were attributed to weapon or weapon system failures.

Based on the historical averages, as well as the detailed analyses for 2007 and 2008 contained in Annexes B and C, the following points are worthy of note:

## **A&E SAFETY AND ADVOCACY PROGRAM OF WORK IN 2009 AND 2010**

During the next two years the intent is to continue developing the A&E Safety and Advocacy program, with special emphasis on: promoting the culture of reporting; trends analysis of accidents and incidents to better understand root causes; and to further develop the advocacy framework. Specific activities planned for the years 2009 and 2010 follow.

### **Further Development and Conduct of Unit Level Courses.**

Monitor roll out and content of new UAR Course, complete development of UESO Course and support Distance Learning development of both UAR and UESO courses.

**Publication of New Education Material.** New and revised posters will be published, for distribution through the Publications Depot. The vignettes concept, supplemented by bulletins, will be implemented to support unit level education. Posters, vignettes and bulletins will all draw on lessons learned through analysis of ammunition accidents and incidents, and distribution of all will be supported by the DAER DIN site.

**Continued Development of the DAER DIN Site.** The DAER DIN site will remain a primary communication and outreach tool. For the year 2009, additional links to the Canadian Forces Range Information System (CFRIS) and the Unsatisfactory Condition Report (UCR) sites will be investigated.

**Policy Development.** The two main policy manuals related to the AESP will be revised:

#### ► **A-GG-040-006/AG-001 DND Explosives Safety Program.**

The manual, which was last updated in 1994, may be integrated into the new policy series under development (Section 3 refers). The manual will be updated to make it more relevant, particularly with respect to the "Explosives Safety Program Development and Evaluation Tool" (ESPDET); and

#### ► **A-GG-040-006/AG-002 DND Ammunition or Explosives Accident/Incident/Defect/Malfunction Reporting.**

DAER will build on the amendments made in the 2008 release, this time focussing on the method of classifying events and the attribution to cause factors. This will make reporting more relevant, facilitate more in-depth analysis and provide adequate information to decision makers. A joint working group format will be used.

### **Investigation Qualifications and Associated Training.**

The 2008 amendment to the manual was partly in response to DND/CF Health and Safety Council direction. The amendment was released as a temporary measure only. In 2009 DAER

will host a joint working group to determine the longer term requirements and appropriate training standards.

### **Development of a Unit Explosives Safety Officer Tool Kit.**

A web-enabled UESO Tool Kit will be developed to complement the UESO Course and to support those appointed to such duties.

### **Establishment of a Multimedia Database on Accidents and Incidents.**

It has become apparent there is very little readily available to support the development of education material such as posters, videos, etc. The aim of this effort will be to access Archives Canada files, as well as news agencies databases, and to gather or procure copies of multimedia files related to ammunition and explosives.

### **Planning for the Production of Training Movies and Videos.**

Actual training videos and movies are so outdated training establishments have ceased to use them. CMP and ECS training establishments will be surveyed with respect to needs and planning will proceed accordingly.

**Recognition Program Framework.** While there are a few national recognition programs in existence wherein deserving employees can be nominated, there is nothing specifically for the promotion of A&E Safety. DAER will develop a national program, with appropriate awards.

## **SUMMARY**

Although there remains considerable work to fully re-invigorate the AESP, the initial steps taken in the 2007-2008 timeframe have been successful and the 2009 and 2010 program of work will further advance the A&E Safety agenda. In particular, DAER will leverage the Outreach program in order to enhance unit and individual level awareness of the AESP and their roles with respect to ammunition and explosives safety. Development efforts will continue in both the outreach program and in individual training in order to provide appropriate knowledge and tools to individuals, and to provide units with personnel appropriately trained in explosives safety.

The 2007 and 2008 analyses (Annexes B and C) have provided food for thought and some themes are emerging. These analyses, along with accidents and incidents still to occur, will provide the basis for the Outreach program in 2009. They will also be used to determine an appropriate theme for the 3<sup>rd</sup> Annual DAER Ammunition and Explosives Safety Conference.



# AMMUNITION AND EXPLOSIVES TRANSFORMATION ISSUES

## BACKGROUND

A number of significant changes relating to the Ammunition Program have either taken place during the last two years or are presently in the planning phases for medium to long-term delivery. To a large extent, these changes are transformational in nature and span the entire A&E community. They are at the very core of the renewal process of the A&E regulatory and safety regime and directly support the development of a modern and integrated A&E life cycle support framework for the DND/CF. For this reason, these transformation issues have been regrouped into one section of the annual report. They relate to:

- ▶ Changes to the A&E strategic governance structure;
- ▶ The Development of the Ammunition and Explosives Safety Information Management System (AESIMS);
- ▶ The Establishment of Terms of Reference (TOR) for key ammunition positions; and
- ▶ The HR renewal efforts to ensure program sustainability.

## CHANGES TO THE A&E STRATEGIC GOVERNANCE STRUCTURE

Although the creation of an independent regulatory/safety organization with the stand-up of DAER represented a significant shift of regulatory and safety matters for A&E, there have also been other related A&E governance structure changes which have had a positive impact on the Ammunition Program. These are discussed further below:

**Creation of the DND/CF Ammunition Board.** Stood up in 2007, the Ammunition Board replaced the Ammunition and Sonobuoy Working Group (ASWG) and the Ammunition and Sonobuoy Management Board (ASMB) which were predominantly lower level committees focused on procurement issues. The newly created Ammunition Board is charged with oversight of all aspects of accountability for, and execution of,



the storage, transportation, employment, acquisition and life cycle management of ammunition and explosives in DND/CF. It is co-chaired by ADM(Mat)/COS and VCDS/DFPPC, thereby linking requirements to acquisition and at the same time, raising the visibility of the Ammunition Program. In the last two years, great strides have been made in addressing some of the larger strategic issues for A&E, with an overall focus in the following areas:

- ▶ Strategic oversight of the annual National Procurement budget for A&E (\$230+ Million);
- ▶ Initiating a review of longer term ammunition requirements through DMGOR sponsored modeling;
- ▶ Creation of a sub-committee structure to address specific issues on behalf of the Ammunition Board; and
- ▶ Option Analysis for distribution of unassigned strategic functions resulting from recent organizational changes to the Ammunition Program (still under development).

With respect to strategic governance responsibilities, the Ammunition Board is also responsible for:

- ▶ Endorsing the five-year procurement plan prior to submission to PMB for approval;
- ▶ Providing guidance to ADM(Mat) with respect to related industrial support policies; and
- ▶ Providing guidance to ADM(S&T) with respect to related S&T activities.

DAER is not a member of the Ammunition Board *per se* but does participate at meetings to provide regulatory guidance and advice. In response to a tasking by the Ammunition Board at the 2008 fall session, DAER is presently examining an increased role by assuming additional strategic oversight of the Ammunition Program on behalf of the Board, as well as assuming the secretariat role.

### **Creation of the UXO and Legacy Sites Program**

**in ADM(IE).** The DND UXO and Legacy Sites Program was created in 2005 in an effort to reduce safety risks posed by Unexploded Explosive Ordnance (UXO) at all “legacy sites” across Canada. The Program identifies and catalogues sites, assesses risks, and works to reduce UXO risk through property controls, assessment surveys, UXO clearance operations, and public education. At present, there are over 700 legacy sites that have been identified by the Program and ADM(IE) faces a significant challenge associated with the related clearance activities. These activities will require years to complete and necessitate a strong partnership with industry. In support of this Program, DAER has been extensively involved in the various

committees and has been providing independent approval of training qualification standards for UXO technicians, as well as recognition of civilian training equivalencies.

### **Stand-Up of CF Explosive Ordnance Disposal (EOD).**

In recognition of the need for a world class integrated EOD capability, CANFORGEN 056/08<sup>1</sup> emphasized some of the changes to the governance structure for CF EOD, placing CF EOD under CLS with a stated mission of acting as the strategic focal point within the CF for planning, coordination and direction of all aspects of EOD in order to protect the force and ensure mission success. DAER has been working closely with CF EOD in the coordination of the related 8000 series DAODs, as well participating in the CF EOD Working Group.

### **ADM(MAT) Organizational Changes to A&E Life Cycle Support and In-Service Management.**

The stand-up of CANOSCOM<sup>2</sup> included the transfer of J4 Ammunition as well as the Canadian Forces Ammunition Depots from ADM(Mat) to the Canadian Materiel Support Group (CMSG), a formation of CANOSCOM. Within CMSG, J4 Ammunition is vested with the responsibility of providing ammunition and explosives support to international operations, as well as support to those domestic operations for which the commands or Level 1s do not have adequate resources. They also exercise technical control of ammunition depots, management of the National Inventory Control Point (NICP), distribution of stocks off-contract, storage of strategic stocks, and execution of 3<sup>rd</sup> line maintenance. Life cycle management functions for A&E were retained within ADM(Mat)/DGLEPM. The re-creation of a Directorate (Director Ammunition and Explosives Management and Engineering) responsible for life cycle management of A&E from procurement to disposal, as well as acting as the DND/CF Engineering Authority (EA), is viewed as a positive step in providing the required focus for A&E within ADM(Mat). The split of responsibilities between ADM(Mat) and CANOSCOM did not come without challenges; however, the majority of issues related to ownership of depots, NICP or EA have either been worked out or are in the process of being resolved.

### **DEVELOPMENT OF THE AMMUNITION AND EXPLOSIVES SAFETY INFORMATION MANAGEMENT SYSTEM (AESIMS)**

The requirement for the development of IM/IT tools for the Ammunition Program was clearly emphasized throughout the CRS Evaluation, which specifically identified that the lack of proper tools was hampering the ability of senior leadership

<sup>1</sup> CANFORGEN 056/08 CDS 007/08 201217Z Mar 08 CDS Organizational Order – Stand-up of CF

<sup>2</sup> CANFORGEN 013/06 CDS 009/09 011330Z FEB 06 CDS Organizational Order – Canadian Operational Support Command

to make informed program decisions. Moreover, the lack of modern automated reporting tools is also viewed as a contributing factor to the present state of inadequate safety reporting, highlighted in Section 4 of the annual report. The following excerpts from the CRS Evaluation point to the importance of developing appropriate safety related IT/IM tools:

► Theme 4 - “Information for Decision Making”:

“...There is a need to take action to improve ammunition safety information collection, analysis and dissemination...”;

► **Theme 5 - “Risk Management”:** “...Weaknesses in DND/CF ammunition safety information collection and analysis are barriers to risk-based safety management...”; and

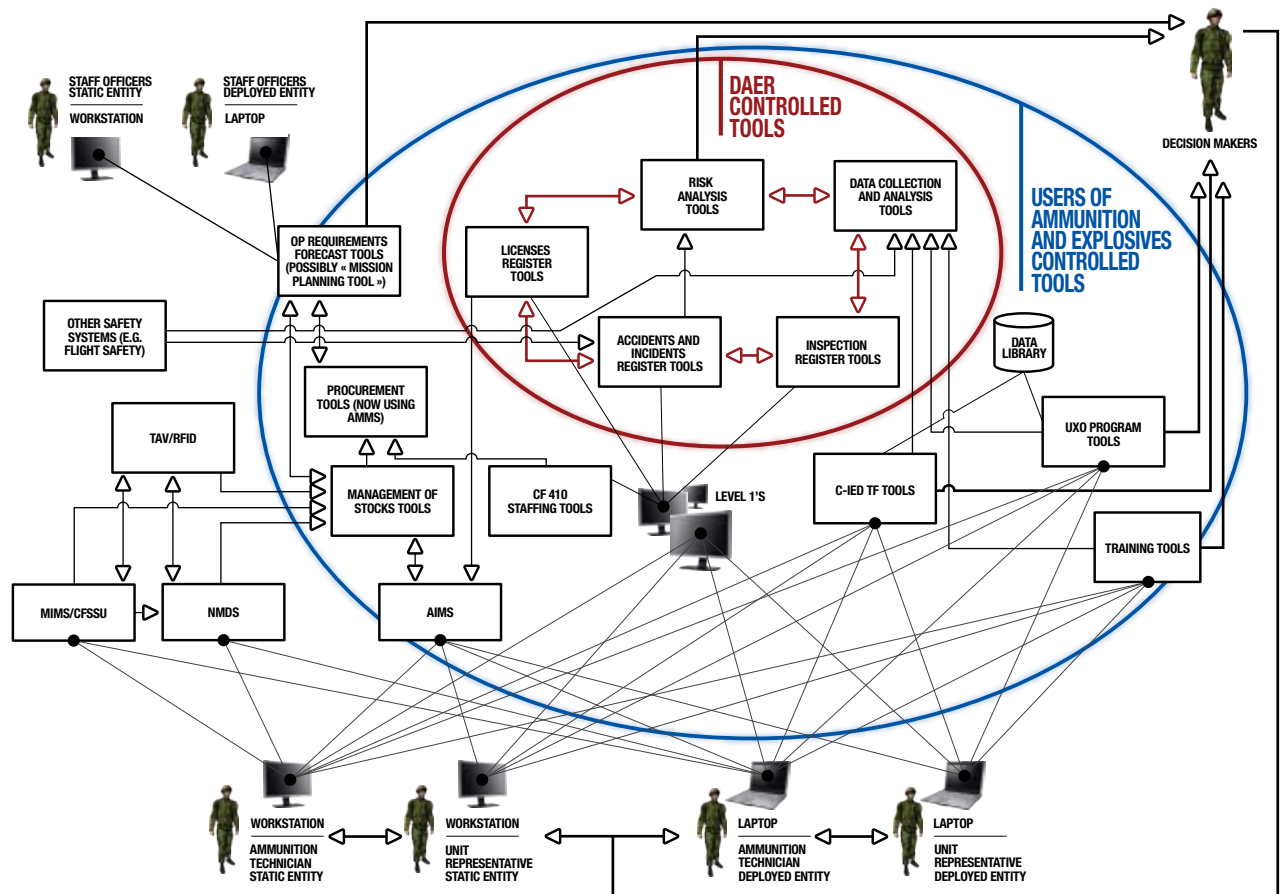
► Theme 6 - “Program Instruments and Alternatives”:

e-solutions in program delivery.”

As part of its initial program of work, DAER began development of an ADM(Mat) Business Requirement for AESIMS in July 2007. Following several iterations of business mapping requirements within ADM(Mat), the final requirement was evaluated and validated by ADM(Mat)/DMSPR in May 2008 and forwarded to ADM(IM)/DIMR for finalisation of an initial options analysis in November 2008<sup>3</sup>.

In general terms, the goal of AESIMS is to provide an enterprise IM/IT solution for the safety management of the A&E program. This will be accomplished by creating a number of new reporting modules required by DAER in its regulatory role, and by integrating or linking to the greatest extent possible a number of existing IT tools presently in use by various L1 organisations. A graphical representation of the concept can be seen at Figure 1.

## AMMUNITION AND EXPLOSIVES SAFETY INFORMATION MANAGEMENT SYSTEM (AESIMS)



**Figure 9 AESIMS Overview**

### **Anticipated Milestones for Development and fielding of AESIMS:**

The next step in the development of AESIMS will be to complete the Business Process Modeling (BPM). This must be completed in order to move ahead with the selection of the best option presented in the report. The BPM of MA&S processes has begun in January 2009, but dates to complete the other BPMs have not yet been set. Despite efforts to move this important element of A&E transformation forward, progress is being impacted by competing requirements for BPM mapping of other critical projects such as MASIS, Automated Financial Statement Project and the Asset Visibility Project. Further work by ADM(IM) will not be possible without the completion of this phase. In the interim, renewal efforts for the A&E Safety program reporting tools will be hampered and the present reporting system and localized IM/IT solutions will continue to be the norm.

### **ESTABLISHMENT OF TERMS OF REFERENCE (TOR) FOR KEY AMMUNITION POSITIONS**

As an initial step in validating the CRS finding that in many instances ammunition safety personnel did not have accurate TOR and were lacking a system to assess competency profiles, DAER conducted an initial benchmarking exercise to scope out existing TOR for key A&E positions at Unit, Base and Command levels. This benchmarking exercise<sup>4</sup> also allowed organisations to provide TOR within a prescribed format if none were in place. Analysis of the responses has validated the CRS finding that TOR are deficient. Of 122 key positions identified, only 35% had acceptable TOR. In order to move forward with the follow-on task of validating the related training/experience requirements, as well as standardization of key functions in the A&E community, DAER will continue to consult with the L1s in the establishment of TOR for key positions. In the 2009-2010 timeframe, the aim is to complete the TOR survey, to standardize and document the TOR in the new Explosive Safety Manual for Life Cycle Safety (refer to Section 3), and to move forward with the follow-on assessment of training/skill requirements for A&E positions.

### **HR RENEWAL EFFORTS TO ENSURE PROGRAM SUSTAINABILITY**

The A&E community presently faces significant challenges in developing and sustaining a healthy program. The Ammunition Technician (AT) trade chronically suffers from a 25% resource shortfall and is strained to support deployed operations. The management of Ammunition Technical Officers (ATO)

across six separate officer occupations remains a challenge, particularly in the areas of selection for training and ATO career progression. On the DND civilian side, staffing of key LCMM and Engineering positions and civilian ammunition workers remains a challenge. Without a viable training and HR resource plan, recruitment efforts are focused on attracting retired CF personnel with the required skill sets, thus exacerbating the issue of an ageing DND civilian workforce. On a positive note, a comprehensive review of the ATO specialty, under the ATO Needs Analysis<sup>5</sup>, is seen as an excellent starting point to address some of the present ATO HR shortfalls. Moreover, there are a number of other initiatives aimed at reversing the present trends, including increased strategic intake to alleviate the present AT shortfall by FY 2010/2011, re-creation of the Air Weapons System (AWS) occupation, under the Air Occupation Enhancement Project in CAS, and the development of a Civilian Ammunition Technician Training package by CANOSCOM. Within ADM(Mat), DAEME has also initiated an overall review of training delivery for civilian Explosive Ordnance Engineers. The possibility of increasing throughput and tailoring course content to DND/CF needs through delivery of a Masters program at RMC (planned start in the fall of 2009) is being actively pursued.

The recent assignment of COS(Mat) J4 Logistics Integrator as the Champion for Ammunition Program HR Promotion and Development at the strategic level and as Chairman of the ATO Steering Committee is viewed as a positive step in providing strategic oversight to resolve a number of important HR issues. DAER will continue advising and supporting ADM(Mat) in finding long term solutions to HR renewal.

### **SUMMARY**

Transformation has been a central theme for the A&E business during the past two years and has encompassed a number of concurrent initiatives which will require leadership attention and commitment to ensure full implementation of the CRS Evaluation. In particular, adequate resourcing for the development and fielding of AESIMS, continued investment in the UXO and Legacy Sites Program for UXO clearance activities, and HR renewal efforts, including the parallel development of TOR, are all required investments for the long term health of the Ammunition Program.

4 1001-1 (DAER 4), "DAER Terms of Reference", dated 08 June 2008

5 CDA HQ/DPD, "ATO Needs Assessment Project", dated June 2007



## CONCLUSION

A key aspect underpinning the creation of an independent regulatory organisation for A&E is the requirement to “produce an annual report to the DM and CDS on the state of A&E safety in the DND/CF”. In examining the present state of A&E safety, it would be useful to provide, as the backdrop, an assessment of progress in relation to the four key areas of the CRS recommendations for improving program performance and ultimately enhancing the state of A&E safety in the DND/CF. The key areas identified by CRS are:

- ▶ Strengthening of the regulatory regime;
- ▶ Provision of a more strategic and focused approach to ammunition safety management and regulation;
- ▶ Increasing the understanding and visibility of ammunition safety risk, with a view to improving results; and
- ▶ Improving on program delivery and performance.

### STRENGTHENING OF THE REGULATORY REGIME

The creation of DAER as the independent regulator in November 2006 is arguably the single most significant indicator of senior corporate leadership’s resolve to invest in the A&E Safety Program and, at the same time, to ensure due diligence with respect to the DND/CF’s exclusion under the *Explosives Act*.

During this reporting period, the main focus has been on the establishment of the required connectivity with L1 organisations; development of a compliance program; formulation of top level policy; and the re-launching of the A&E Safety Program.

Although 2007 and 2008 should be construed as a transition period and an initial period for maturation of a new regulatory regime, there are signs that the newly created structure has already started paying dividends in a number of areas, namely by:

- ▶ Implementing a reporting structure which facilitates access to the senior leadership on those issues requiring visibility;
- ▶ Establishing an oversight and coordination function on activities which span across a number of L1 organisations; and
- ▶ Increasing visibility internationally and inter-departmentally through a central regulatory agency.



As with any newly established process, there remains considerable work in order to ensure that the new regulatory framework is firmly ensconced at all levels of DND/CF. Accordingly, the focus in 2009-2010 will be: to continue strengthening coordination and oversight with relevant L1 organisations; forging international relationships with special emphasis on active participation in the NATO AC/326 Ammunition Safety Group; bilateral efforts with the US Department of Defense Explosives Safety Board (DDESB) and the UK Defence Ordnance Safety Group (DOSG); as well as engaging senior leadership on the required issues.

### **STRATEGIC AND FOCUSED APPROACH TO AMMUNITION SAFETY MANAGEMENT AND REGULATION**

In order to adopt a strategic approach to safety management and regulation, DAER's program of work was structured along the lines of policy development and compliance program implementation.

In the area of policy development, it was quickly recognized that a complete review of existing policy and the establishment of a review cycle would take years to accomplish. Initial evaluation of the general state of A&E policy revealed several policy gaps which will require significant investments. Accordingly, in the 2007-2008 program of work, immediate priority was given to the redrafting of DAODs in support of the overarching policy framework, as well as immediate attention to lower level documentation in need of immediate re-work.

In the 2009-2010 timeframe, top policy priorities will include: an overhaul and restructuring of A&E policy into a more coherent structure that correlates more closely with all aspects of the life cycle safety of A&E; the establishment of a risk management framework and further development of safety regulations for deployed operations. Moreover, significant effort will be required by ADM(Mat) for the production of CFTOs for a large number of ammunition articles in the inventory. It is recognized that this will take years to complete, however a plan of work with anticipated milestones needs to be developed.

A key component of adopting a strategic approach to A&E safety regulation is the establishment of a compliance framework emphasizing collaboration and consultation with the various L1 stakeholders. In the initial program of work, considerable effort was expended in establishing the required lines of communication in order to gain visibility of processes and safety related data. Initial compliance verifications of various L1 organisations, although constrained in scope to facility inspections, have produced positive results upon which to build further.

In 2009-2010, the compliance program will be further developed to include: an examination of various engineering processes in ADM(Mat); additional compliance verifications of A&E safety in deployed operations; a review of ADM(IE) UXO and Legacy Site activities and processes; and monitoring of the progress of the CF Ammunition Demilitarization Capability Project.

### **INCREASE UNDERSTANDING AND VISIBILITY OF AMMUNITION SAFETY RISKS – IMPROVE RESULTS**

2007-2008 saw the re-launching, and renaming of the DND/CF Ammunition and Explosives Safety Program with: the republishing of the related CFTO on reporting; development of the DAER DIN page as the main communication medium for the A&E community; and the revamping of the safety poster campaign. The annual explosives safety conference has also yielded positive results with respect to gaining a better understanding of the issues affecting the community and, concurrently, has provided NDHQ staff the opportunity to communicate progress at the Headquarters level with respect to all aspects of A&E life cycle management and safety.

The 2008 safety conference focused on the culture of reporting and provided an excellent forum in which to discuss the initial DAER analysis of 2007-2008 incidents and accidents. With the exception of a relatively healthy reporting culture within CMS, the reporting of incidents and accidents by all environmental / operational commands and L1 organisations is not commensurate with the levels of activities associated with A&E.

In 2009-2010, issues revolving around the culture of reporting will be examined in more detail. In particular, DAER will seek increased leadership involvement and the inculcation of a just culture of reporting (building on the experience of the Flight Safety Program) as means to build a healthy safety program. Furthermore, the advocacy and outreach program will be enhanced through the development of training, continued development of posters and other educational media, as well as the creation of a recognition program framework.

In order to provide increased visibility and to improve results for the A&E Safety Program at large, appropriate investments in suitable IT tools for reporting and data collection and analysis are required. DAER has prepared a statement of requirement for the Ammunition & Explosive Safety Information Management System (AESIMS) in order to provide to the A&E business an integrated solution for safety reporting and data collection. Unfortunately, AESIMS development is presently competing with other important DND/CF wide initiatives such as Material Acquisition and Support Information Management System (MASIS), Audited Financial Statement Project (AFSP) and the

## AN OPPORTUNITY FOR RENEWAL

asset visibility project. Clear timelines and deliverables in regard to AESIMS are still not known. In the interim, renewal efforts for safety program enhancement will continue to be constrained by this limitation.

### IMPROVE ON PROGRAM DELIVERY AND PERFORMANCE

In addition to the creation of DAER, there have been a number of change initiatives which will ultimately improve on program delivery and performance. A number of other organisation structural changes are showing the potential to markedly impact DND/CF's safety agenda and need to be underscored. These include: the creation of the Ammunition Board for strategic governance of the Ammunition Program; the creation of the UXO and Legacy Sites Program in ADM(IE); the re-creation of a Directorate level focal point for A&E Engineering and Maintenance in ADM(Mat); and the consolidation of CF EOD in CLS. Collectively these various changes are viewed as positive factors with respect to program delivery.

There has also been recognition of the need to examine several of the HR and training issues to ensure sustainability of the Ammunition Program. With the endorsement of the Ammunition Board, DAER is examining a wide range of issues with a view to ensuring program sustainability for the future. These include: CF personnel selection and specialist training; terms of reference for specialist positions; and training development and enhancement for DND civilian personnel.

The chosen theme of the first annual report – *“An Opportunity for Renewal”* - not only recognizes the fundamental changes that have taken place within the Ammunition Program, it also emphasizes the need to maintain the present momentum to ensure that DND/CF can continue moving its safety agenda forward. In the end, present opportunities must not be squandered if DND/CF is to fully deliver a program which will minimize potential loss of life and material due to preventable A&E mishaps.

Overall, it is viewed that the present state of A&E safety is such that DND/CF is meeting its obligations under its exemption to the *Explosives Act*. The new corporate regulatory structure has enabled a central strategic focus for the Ammunition Program and initial steps have been taken to establish the required policy framework, to initiate a compliance program, and to re-invigorate the safety and advocacy program

## ANNEX A



## STATUS OF MAIN POLICY MANUALS

Cycle	Process	Publications	Status		
Complete Life Cycle	Risk Management	No current holistic Risk management framework. This topic is to be included in a new DAOD and the proposed - A&E Vol 1 Manual - Life Cycle Safety			
	Personnel - Training standards, qualifications, terms of reference	Various standards concerning training found in several publications. Currently, there are a limited number of documents that contains the terms of reference for key positions. These topics will be included in the proposed - A&E Vol 1 Manual - Life Cycle Safety			
Acquisition	Engineering	DAOD 3002-2 Insensitive Munitions			
	Procurement	DAOD 3002-1 Certification of Ammunition and Explosives A-LM-007-014/AG-001 Canadian Forces Supply Manual			
In-service	Deployed Ops	Presently applying the AASTP 5, NATO Guidelines for the Storage, Maintenance and Transport of Ammunition on Deployed Missions or Operations. To be included in A&E Vol 5 Manual - Deployed Operations			
	Storage of inventory (fixed/permanent facility)	C-09-153-001/TS-000 Ammunition and Explosives Safety Manual Volume 1, Storage and Transportation			
		A&E CFTOs (250+)			
	Maintenance & Transportation	A-LM-158-005/AG-001 Transportation Manual			
		C-02-040-010/MB-003 Driver's Manual for Dangerous Goods			
		A-LM-117-001/FP-001 Transportation of Dangerous Materiel by the Canadian Forces			
	Use	DAOD 3002-5 Use of Firearms, Ammunitions and Explosives			
		DAOD 3003-1 Management of Controlled Goods			
		Army - B-GL-381-001/TS-000 Training Safety			
		Air Force - B-GA-297-001-TS-000 Safety Orders for Canadian Forces Air Weapons Systems			
		Navy - C-09-153-003/TS-000 Explosive Safety Manual Volume 3 - Ships			
		C-55-040-001/TS-000 Safety Precautions and Incident Prevention Instructions Radio Frequency Safety Program			
		CFAO 34-51 Radio-Frequency Radiation Safety			
		DAOD 3002-3 Ammunition and Explosives Safety Program			
DAOD 3002-4 Ammunition or Explosives Accident, Incident, Defect or Malfunctioning Reporting					
C-09-011-002/AG-000 Duties and Responsibilities of a Service Representative Officer (SRO)					
Disposal	Demilitarization & Destruction	Overall Demilitarization policy			
		DAOD 8000-0 Explosive Ordnance Disposal			
		DAOD 8000-1 Explosive Ordnance Disposal Instructions			
		C-09-008-001/FP-000 Destruction of Surplus Obsolete & Deteriorated Ammunition			
		C-09-008-002/FP-000 Destruction of Duds and Misfires Ammunition on Canadian Forces Ranges and Training Areas			
		C-09-008-003/FP-000 Explosive Ordnance Disposal - Disposal of Stray Ammunition			
	Policy does not exist.		Policy exists, but requires revision and/or substantial clarification.		Policy exists and is deemed current.



## ANNEX B

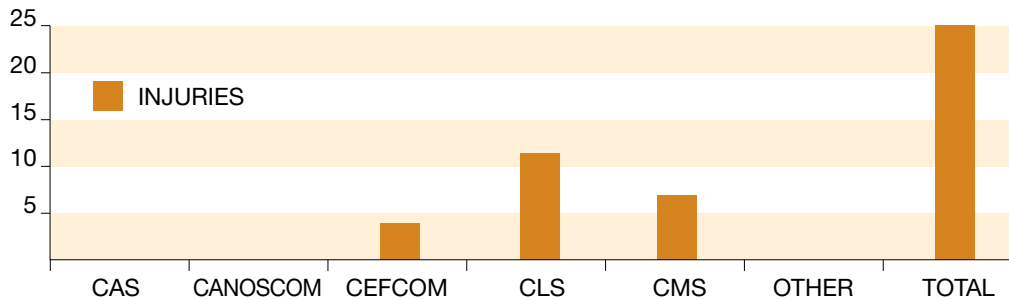


# AMMUNITION AND EXPLOSIVES SAFETY PROGRAM ANALYSIS — 2007<sup>1</sup>

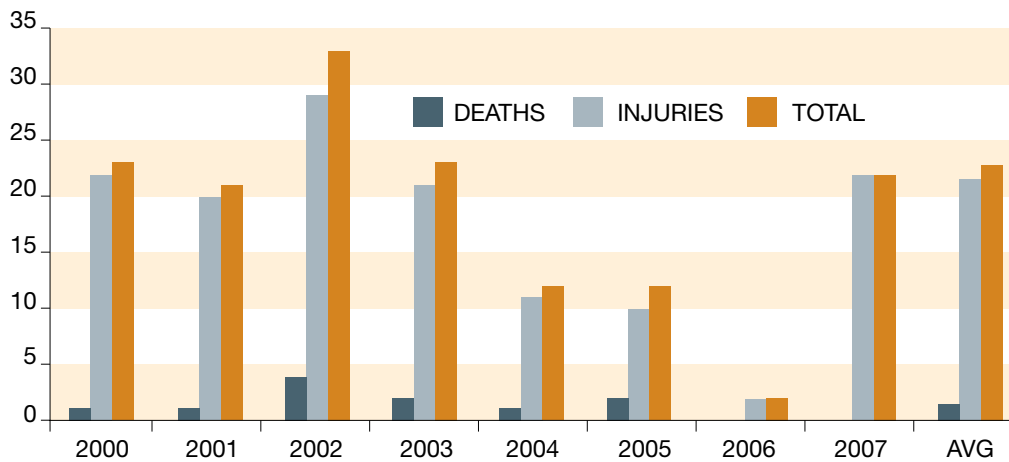
<sup>1</sup> This analysis was originally published in the 3<sup>rd</sup> Annual DND/CF Safety Council Report. The numbers in the version seen here were revised in November 2008 to include additional incidents not included in the original analysis.

## AN OPPORTUNITY FOR RENEWAL

**Deaths and Injuries.** For the second year in a row, there were no deaths reported under the Ammunition and Explosives Safety Program<sup>2</sup> (AESP). There were, however, 22 injuries, including one non-DND civilian.

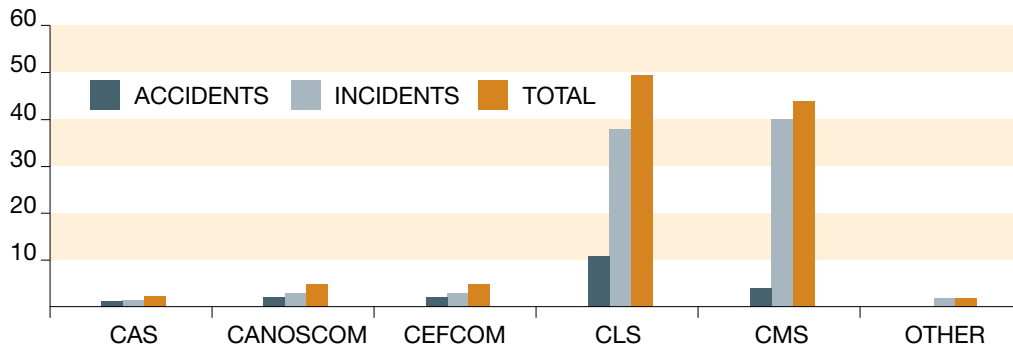


For an historical perspective, an eight-year graphical summation follows:



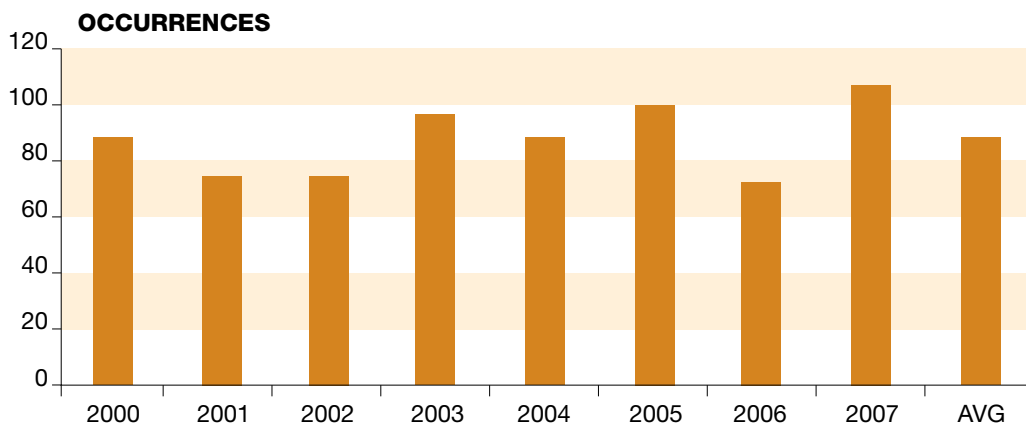
<sup>2</sup> There have been a number of deaths directly related to the Ammunition and Explosives Safety Program (AESP) that have occurred during this period, from either suicide or negligent discharges; however, contrary to policy, these were not reported under the AESP.

**Number of Occurrences.** A total of 107 ammunition accidents and incidents, not inclusive of flight safety occurrences (involving A&E), were reported and recorded in 2007: 20 accidents and 87 incidents, distributed as below:



**NOTE:** Throughout this annex, data shown for CAS does not include any munitions-related accidents or incidents that were reported in FSOMS.

The total number of occurrences (accidents and incidents) in each year 2000 through 2007 are shown below:



## AN OPPORTUNITY FOR RENEWAL

For 2007 the number of accidents and incidents was 23% above average. This is attributed to:

- ▶ Increased reporting by CMS units; and
- ▶ Screening vigilance at Fredericton airport.

**Cause Factors.** The 107 accidents and incidents in 2007 were attributed to the following cause categories:

Cause Factor	Number	Human Error
Error in Drill	22	22
Handling	14	14
Carelessness	10	10
Unauthorized Possession	13	13
Illegal Disposal	3	3
Theft	1	1
Other Causes	17	
Equipment Failure	10	
Storage	9	
Transportation	4	
Unknown	3	
Design Fault	1	
Tampering	-	
Free From Explosives	-	
Total	107	63

The number of accidents and incidents most obviously directly related to human error (handling, carelessness, error in drill, theft, illegal disposal and unauthorized possession) total to 63. In reality, the majority of the rest all have a large factor of human error as well. Ammunition itself normally functioned as intended.

Common User natures (SAA and pyrotechnics) were involved in the majority of incidents related to handling and carelessness. It is difficult to attribute this to either over-familiarity or poor training; increased focus on the unit aspects of the AESP is recommended as a means of sharpening the individual's focus on the dangers inherent in using ammunition and explosives and, concomitantly, the increasing individual's attention to detail.

All 13 reported instances of unauthorized possession involved SAA and pyrotechnic natures. Of particular concern, in eight instances the unauthorized possession was discovered during pre-flight screening procedures. SAA and pyrotechnic natures, whether live or expended, have a strong attraction for certain personnel and units need to be diligent in administering post-firing declarations and during kit checks.

There were five reported instances of loss of stores by divers. There may be benefit in reviewing means of securing stores to divers operating underwater. There were no other munitions categories of sufficient repetition to merit comment.

A relatively large number of occurrences have been attributed to "other causes", which does not lend itself to statistical analysis.



L1 or Command Responsible for Reporting	2007 Accident Summary	Date
CLS	Student fired .50 cal while barrel was not fully locked onto weapon body. Reported in 2007	2006-12-13
CMS	Two 57mm were laterally bent under hydraulic force when they jammed under the rocking arm as it lowered.	2007-02-07
CMS	Four COMET Flares were fired causing minor burns to the hands of 3 members. During a second firing event, 4 more flares were fired, resulting in 1 member requiring treatment for a perforated eardrum.	2007-02-19
CMS	A broken part on the Feed Ruler Assembly caused one round of 57mm to laterally feed into the assembly, causing damage to the cartridge case.	2007-02-28
CLS	A/RSO received a shrapnel wound from a Grenade when he failed to ensure he was completely behind protective cover.	2007-05-11
CLS	Cook-off occurred in a C9A1 LMG weapon. The weapon was extensively damaged. Member received a minor flash burn to hand.	2007-05-12
CLS	During a Live Fire Exercise a member was shot. NIS investigation.	2007-05-17
CLS	While attempting to deprime the gun with the M82 Primer not fully ejected, the Primary Feed Mechanism (PFM) was forcefully pushed, putting pressure on the primer and causing it to fire with the PFM not locked in the forward position. One member received burns to both arms.	2007-06-12
CLS	Member cut open Arty Sim and used cigarette to ignite photoflash powder. Member burned on hand.	2007-07-02
CLS	An MLVW carrying various natures of ammo rolled causing the ammo to spill onto the ground.	2007-07-03
CLS	While attempting to clear an obstruction, one round of 7.62mm ball cooked off in the C6 weapon. Member received superficial burns to face and eyes.	2007-07-04
CLS	A Thunderflash was placed and ignited beside a dud Artillery Simulator (unauthorized disposal technique). The flash and heat from the blast resulted in facial injuries.	2007-07-10
CAS	Two Diver Signal Recall lost during a dive exercise.	2007-07-12
CLS	Civilian driver found open cardboard box of Trip Flares on side of road.	2007-07-26
CEFCOM	7.62mm round exploded in the weapon breech while the feed cover was open, injuring 2 personnel.	2007-09-16
CANOSCOM	During loading of VLSS missile, the forklift operator hit the launch canister.	2007-09-27
CANOSCOM	During missile loading into the launch canister, the umbilical cable sheared off at the missile.	2007-10-11
CMS	During pyrotechnics demonstration on flight deck, two personnel fired Comets using correct procedures - one received minor burns to his left hand.	2007-10-31
CLS	Member was loading 81 mm mortar with HE when projectile slipped and entered tube. Member did not remove hand and mortar fired, severing two fingers from right hand.	2007-12-08
CEFCOM	Member sorting out the salvage pile was injured when a Signal Illumination Hand Fired functioned. Member received second degree burns to one hand.	2007-12-19

NOTE 1 – Originally reported in FSOMS

NOTE 2 – CANOSCOM/J4 Ammunition provides L1 Subject Matters Expert services to CANSEFCOM

NOTE – Greyed out cells indicate deliberate deviation

L1 or Command Responsible for Reporting	2007 Incident Summary	Date
CEFCOM	16 sea cans were moved without being emptied nor their contents secured. Contents of 4 cans were displaced by the move. Reported in 2007	2006-12-11
CMS	During a CIWS Harbour Inspection Trial, it was discovered that 200 rounds were corroded causing the weapon system to jam.	2007-01-15
CLS	During a vehicle return, one Grenade Hand Smk Screening was found tied to the right rear of the vehicle.	2007-01-25
CLS	Demolition charges found in unauthorized storage locker - issued to wrong unit.	2007-01-26
CLS	Member burned by pyrotechnic. Report taken from SIR as no AESP report received.	2007-02-03
CMS	Marker Man Overboard was thrown over the side during a MOBEX Exercise. Member did not hear that it was only an exercise before he threw the marker overboard.	2007-02-06
CMS	During aggressive manoeuvres water entered port torpedo tube number 2, activating range pinger of torpedo	2007-02-13
CMS	During an In-Harbour Transfer of ammunition, the ammo sent exceeded the allowed limit for the Jetty.	2007-02-20
CMS	Wave hit port side of ship causing port side Marker Man Overboard to be lost over the side.	2007-02-24
CMS	During rough seas, a pelican boat pack containing various pyrotechnics was lost	2007-02-24
CMS	During ship ammunitioning, a full container of 57mm ammo slipped from a members hand and struck him on the knee.	2007-02-28
CLS	A Charge Demolition C4 and a Grenade Hand Smk involved in an ammo incident (possible theft).	2007-03-15
CMS	A small quantity of HILTI rounds were noted missing (lost) when the ship returned from sea.	2007-03-16
CMS	Civilian contractor mistook pyrotechnic locker for .50 cal and 40mm ready-use lockers and commenced grinding on exterior.	2007-03-19
CMS	HOT WORK was conducted on a locker containing pyrotechnics. Contractor was supposed to refurbish an empty locker.	2007-03-20
CEFCOM	During a Fire Mission the 4th of 5 rounds would not fire. The cartridge was reprimed twice. On the 3rd reprime the cartridge fired while not fully seated in the weapon.	2007-04-13
CLS	Shipment of 9 Pdr Blank from a CFAD was not packed as per Log Data, crates were not secured to pallet and 1 item damaged beyond repair.	2007-04-19
CMS	100 rounds found in locker in M548 container designated and labelled for Dummy ammo. Custodian unaware of live ammo. Ammo had not been properly inspected after download from the CIWS.	2007-04-22

L1 or Command Responsible for Reporting	2007 Incident Summary	Date
CLS	Responding to a fire alarm, the fire department found half of a Thunderflash near the pull box.	2007-04-27
CLS	A Just-In-Time delivery of high explosive Grenades arrived on time but the unit arrived 6 hours late and the Grenades had to be secured in violation of the units DND 1004.	2007-04-27
CLS	While mowing corn stalks near the old Rivers AF Base, a fire started. While attempting to extinguish the fire, an old piece of Incendiary Ordnance (UXO) filler was exposed causing the fire to flare up.	2007-04-29
CMS	A large quantity of Lube Oil was accidentally released from the Funnel Area of the ship coating 12 missiles. No Damage to missiles caused by spill.	2007-05-02
Other	Two Impulse Cartridges were lost in a Contractor Facility Hgr.	2007-05-03
CMS	During a stock count, a deficiency of 64 rounds was discovered.	2007-05-07
CLS	168 rounds of 7.62mm found in a BISON.	2007-05-09
Other	Large amount of various munitions scrap and Aids to Production found in CMS Metals scrap yard in Regina, Sask subsequent to a routine EOD pick-up from a private residence (child admitted taking items from scrap yard). Initial EOD response was from Winnipeg. Detailed assessment of situation was conducted by CFAD Dundurn personnel.	2007-05-10
CLS	Member suffered minor flash burn when opened feed cover of C9 LMG to remedy stoppage and round cooked off. Report taken from SIR as no AESP report received.	2007-05-12
CMS	ISSC contractors conducted work within 2 m of 40mm Ready Use lock-up, .50 cal Ready Use lock-up and demolition lockers. Although lockers were empty, lockers had not be certified Free From Explosives	2007-05-14
CMS	During Dive Operations, one Signal Distress Day/Night was presumed lost and sunk to the bottom as a search of the equipment and boat was negative.	2007-05-17
CLS	During a kit inspection, one pyrotechnic and various SAA items were discovered in a members rucksack.	2007-05-17
CLS	A misfired smoke Grenade was returned in the salvage. While inspecting the salvage, the striker mech was accidentally tripped, functioning the Grenade.	2007-05-23
CLS	A suspicious item was noticed under the Artillery monument. It was a block of wood wrapped with dummy det cord - suspected of being part of an exercise scenario and forgotten.	2007-05-26
CLS	While hand loading a 155mm Illuminating projectile onto an HLWV in the rain, the projectile slipped and dropped onto the ground dislodging the base plate.	2007-06-07
CLS	Member carrying live ammunition was intercepted by Airport Security.	2007-06-08
CLS	During a security check of kit prior to boarding an Aircraft, a member was found with one round of SAA in his Gas Mask Carrier.	2007-06-21

L1 or Command Responsible for Reporting	2007 Incident Summary	Date
CMS	A Day/Night Distress signal was lost at sea when the signal fell out of the pocket of a rescue swimmer during a man overboard exercise.	2007-06-21
CLS	Airport security intercepted a member with one round 5.56mm	2007-06-21
CMS	Ammunition transfer from ship to FDU EOD without approval.	2007-06-27
CMS	Flooding of the port side and midship pyrotechnic lockers.	2007-06-28
CMS	An ESSM canister failed to function as intended and was returned for examination.	2007-07-04
CANOSCOM	While selecting a pallet of 155mm Propelling Charges from a stack, the strapping caught another pallet resulting in the fall of two pallets.	2007-07-11
CLS	RCMP and Mil Members were called to what appeared to be a stray round striking a civilian house in Lakeville NS. The round was identified as a 7.62mm bullet, apparently fired on the ranges in Aldershot.	2007-07-13
CLS	An Artillery Simulator was functioned inside a portable chemical toilet resulting in the holding tank walls being blown out of the toilet.	2007-07-13
CMS	HERO safety precautions were not taken during the downloading of CIWS Ammunition.	2007-07-19
CMS	A member sustained a small laceration to the right hand during ammunitioning of 100cm Rockets.	2007-07-23
CLS	During routine hygiene inspection, five pyrotechnics were found inside a drawer in a locker. Items had not been returned after exercise.	2007-07-23
CLS	Airport security intercepted a member SAA in his Webbing.	2007-07-28
CLS	Dud 105mm HE projectile was returned to the ammo compound in a vehicle carrying salvage.	2007-08-02
CLS	While receiving aids to production returned from a firing range, a misfired 105mm HE round was found on the vehicle. The vehicle was not placarded and had not followed internal dangerous cargo routes.	2007-08-07
CLS	Airport security intercepted a member with one round 5.56mm	2007-08-08
CLS	Cadet found in possession of expended items of SAA and pyrotechnics.	2007-08-11
CEFCOM	Classified event	2007-08-16
CLS	Airport security intercepted a member with expended SAA casings	2007-08-18
CLS	Two 40mm cartridges found in tree line behind base building	2007-08-20
CLS	Dud Artillery Simulator found in ammunition salvage.	2007-08-23



L1 or Command Responsible for Reporting	2007 Incident Summary	Date
CMS	During routine garbage collection at Martinique Beach, a Dept of Natural Resources employee was carrying a plastic garbage bag when it started to produce a white smoke. Second employee extinguished fire with fire extinguisher. They opened bag to find Marker Location Marine C2A1 and contacted authorities.	2007-08-28
CMS	During routine inspection, mixed compatibilities found by Fleet Ammunition Inspector (FAI).	2007-09-05
CLS	A member tried to pass through Airport Security checkpoint while in possession of fired blank SAA.	2007-09-08
CMS	Civilian police turned over a 7 Pdr projectile recovered from a private residence.	2007-09-09
CMS	During missile unload, two umbilical cables were found seized to the missile connectors. The missile was removed with both cables attached.	2007-09-10
CMS	Day and Night Flare was noticed missing from a Divers knife upon surfacing.	2007-09-12
CAS	Signal Distress Day and Night Flare left in the open on hangar floor.	2007-09-12
CMS	Marine Smoke Markers C2A1 were found to be damp/corroded during FAI inspection while ammunition transfer was underway.	2007-09-18
CMS	Mould was found in the Main Magazine of an HMCS. Reported to inform of possibility that mould spores may be present on the ammo containers.	2007-09-19
CLS	Airport security intercepted a member with one round 7.62mm	2007-09-22
CMS	During inspection of Explosive Lockers by the FAI, mixed compatibilities were found.	2007-09-27
CMS	Inadvertent activation of salt water fire suppression system flooded all the individual lockers in the chaff magazine.	2007-10-02
CMS	Unauthorized transfer of Force Protection ammo to jetty (contravention of local regulations)	2007-10-03
CLS	Dumpsters picked up from range were being emptied at local waste management facility when SAA rounds were found.	2007-10-05
CMS	Marker Location Marine failed to function. Arming member had been observed pushing in plugs prior to throwing water; however, on debriefing member could only confirm he had turned the arming mechanism as far as he could by hand, but could not confirm the arrow pointed to armed.	2007-10-10
CMS	While clearing a weapon, a round was inadvertently discharged over the side and into the sea.	2007-10-10
CMS	FAI discovered pyrotechnics stored in unsuitable (no sprinkler protection) locker. Due to broken hasp on demolition locker, contents were moved to pyrotechnic and smoke lockers. Compatibilities had been respected, but sprinkler protection was lacking on smoke locker.	2007-10-11
CMS	On completion of Dive-Ex, two Day/Night Signal Distress Flares could not be accounted for.	2007-10-14

L1 or Command Responsible for Reporting	2007 Incident Summary	Date
CLS	Airport security intercepted a member with three inert SAA cartridges	2007-10-21
CMS	During basic AA FIREX a 76mm round became jammed in the SRGM transfer station. Attributed to shutdown of hydraulic system when 76mm SRGM entered cutout zone.	2007-10-23
CLS	A Grenade Hand Smk HC was discovered outside a building by a PSP employee while jogging.	2007-11-02
CMS	While conducting RAS, wave struck on STBD side of the ship releasing the Pains Wessex located on the aft side quarterdeck. It was pulled off its bracket in such a way that the wires were pulled out, activating the lights and smoke.	2007-11-07
CMS	During reinstallation of port quarterdeck Pains Wessex into bracket after man overboard drill, Pains Wessex was inadvertently activated.	2007-11-15
CLS	RCMP reported finding of an ammunition item inside a shipment of used clothing.	2007-11-19
CLS	Soldier threw fragmentation Grenade which bounced off the wall and fell back into the bay. Instructor and thrower evacuated the bay, then Grenade functioned. Another Grenade left in the bay did not function, but was perforated by fragments.	2007-11-21
CMS	Two divers noticed their Signal Distress Day and Night were missing off their knives after jumping out of the HELO during training.	2007-11-21
CANOSCOM	An inter-depot transfer of Torpedoes was discovered to have no dunnage to block and brace the load in a fixed position on the flat deck surface.	2007-11-29
CMS	Officer of the Day posted unqualified sentries to supervise civilian contractors	2007-12-01
CMS	During boarding ops, one pistol magazine containing eight rounds was lost over the side.	2007-12-05
CLS	City police, having pulled over a motorist, discovered a Grenade Hand Smoke in car.	2007-12-09
CLS	Eight boxes fell from a vehicle while being moved from magazine to Transit. Loss was not noticed until four days later when Roads and Grounds member doing snow removal discovered boxes on the route.	2007-12-13
CMS	Four flares and four cartridges were expended during pax Helo ops when self-defence suite (SDS) responded to a false alarm activation of the SDS missile approach warning system.	2007-12-24

NOTE 1 – Originally reported in FSOMS

NOTE 2 – CANOSCOM/J4 Ammunition provides L1 Subject Matters Expert services to CANSEFCOM

NOTE – Greyed out cells indicate deliberate deviation

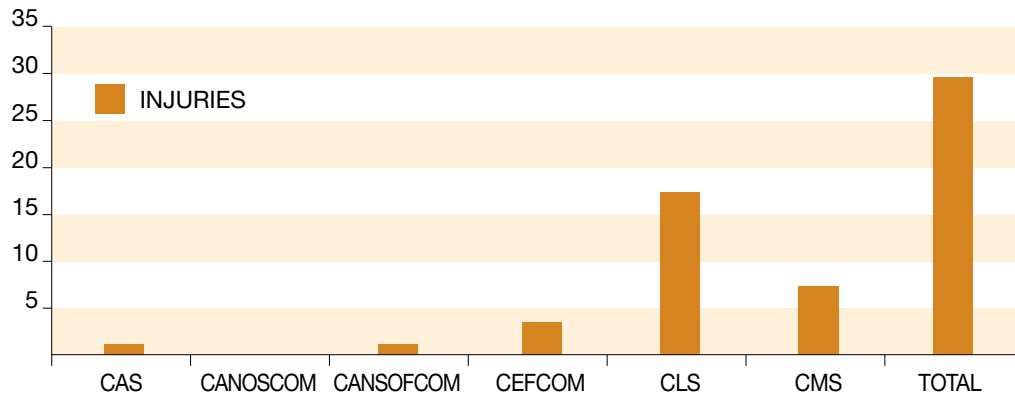
## ANNEX C



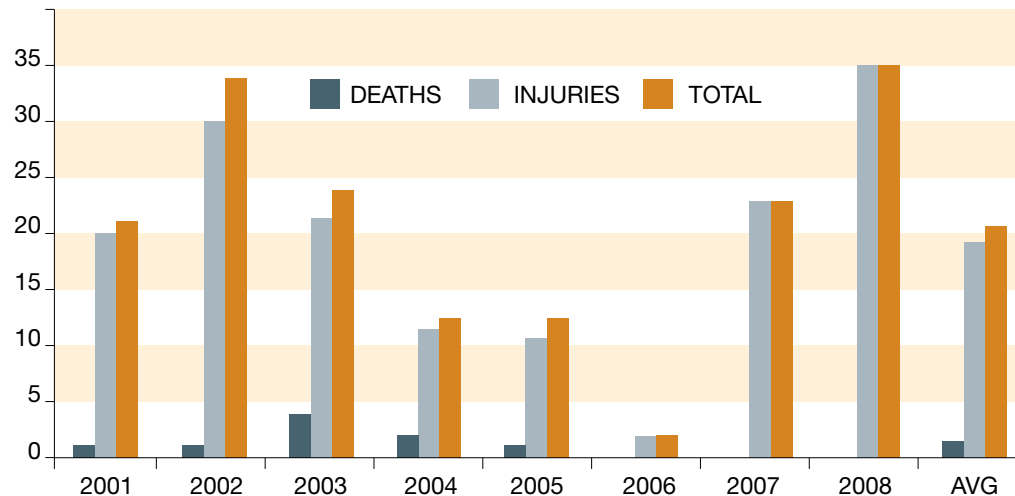
## AMMUNITION AND EXPLOSIVES SAFETY PROGRAM ANALYSIS — 2008

## AN OPPORTUNITY FOR RENEWAL

**Deaths and Injuries.** For the third year in a row, there were no deaths reported<sup>1</sup> under the Ammunition and Explosives Safety Program (AESP). There were, however, 34 injuries.



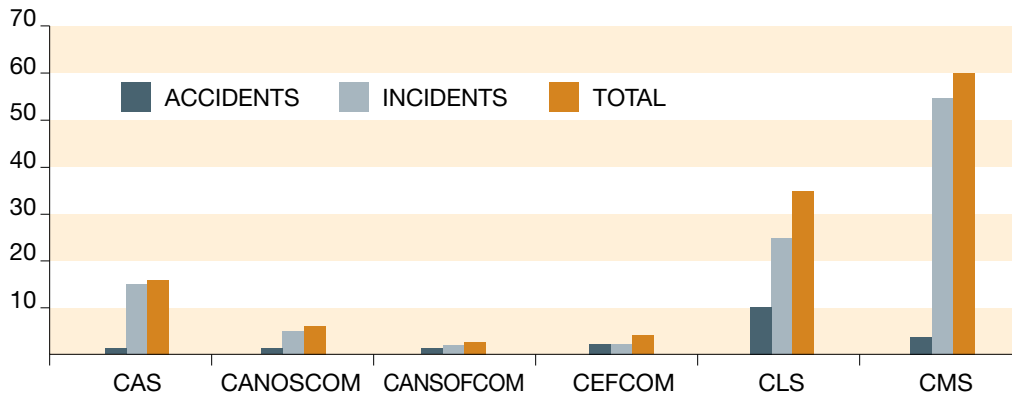
For an historical perspective, an eight-year graphical summation follows:



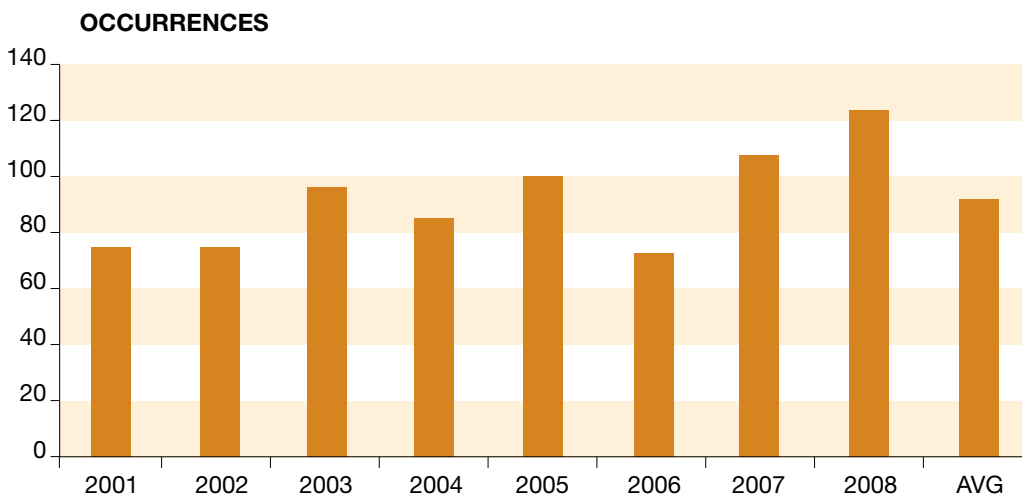
It should be noted that 13 of the 34 injuries occurred in a single accident (smoke inhalation when smoke grenades were functioned inside a tunnel).

<sup>1</sup> There have been a number of deaths directly related to the Ammunition and Explosives Safety Program (AESP) that have occurred during this period, from either suicide or negligent discharges, but none of these were reported under the AESP, even though they should have.

**Number of Occurrences.** A total of 123 ammunition accidents and incidents were reported and recorded in 2008: 19 accidents and 104 incidents. Those numbers include 9 incidents reported as flight safety occurrences involving A&E. The accidents and incidents are distributed as per the following table:



The total number of occurrences (accidents and incidents) in each year 2001 through 2008 are shown below:



For 2007 the number of accidents and incidents was 23% above average. For 2008 the number of accidents and incidents was 35% above average. The number of accident and incident reports is increasing, mainly as a result of diligence in reporting by CMS units. This increase is not interpreted as a decrease in safety. The concern is that the naval increase is masking a paucity of reports from CLS units and deployed operations. A very high volume of ammunition is being consumed in operations and training; the high operational tempo is increasingly stressing both units and personnel, yet numbers of reports have declined. There is concern that, with the number of complex issues that must be managed in a time of high operational tempo, ammunition and explosives safety is not receiving the required leadership attention.



**Cause Categories.** The 123 accidents and incidents in 2008 were attributed to the following cause categories<sup>2</sup>:

Cause Category	Number	Personnel Related
Ammunition-related (defect, malfunction, design error)	2	
Deliberate Deviation	18	18
Human Error (error in drill, mistake, poor judgement)	83	83
Other Causes	14	
System-related	1	
Weapon-related	5	
Total	123	101

A relatively large number of occurrences have been attributed to “other causes”, which does not lend itself to statistical analysis. Cause factor attribution will be the subject of further study.

Ammunition itself normally functioned as intended. Common User natures (SAA, hand grenades and pyrotechnics) continue to be involved in the majority of incidents related to usage and handling. These are not just Common User natures; they are also the natures most frequently used by members. The outreach campaign will focus on this category in 2009. Of the two reports of ammunition-related occurrences, one instance involved the discovery of a damaged item in stock; the other a premature detonation of a Charge, Depth, HE, DM211. The injuries and damage in the latter were exacerbated by human error. The number of accidents and incidents attributed to personnel (deliberate deviation and human error) total to 101, fully 82% of all ammunition accidents and incidents. In reality, many of the rest have a large factor of human error as well, as related above in the DM211 event.

Deliberate deviations represented 15% of all events and are of particular concern as, in these cases, it was deemed that procedures had been deliberately contravened. Accidents and incidents related to deliberate deviations are indicated in the “2008 Accident and Incident Summary” annex with a grey background. Human error accounted for 67% of all accidents and incidents. The vast majority were attributed to carelessness and poor judgement (contributing factors) and usage and handling (activity type). Further analysis will be conducted with the aim of focusing the outreach campaign.

There is insufficient evidence at this time to make a general statement that personnel are receiving inadequate training; however, there were a number of instances that do call into question local focus on training and standards:

- ▶ Accidental discharge of 76mm;
- ▶ Accidental discharge of 5.56mm by newly arrived member who had not received appropriate refresher training;
- ▶ Accidental discharge of a NEUTREX by member who had not been trained on new EOD remotely operated vehicle;
- ▶ Accidental discharge of 57mm;
- ▶ Error in drill in firing of Comet flares – member misunderstood firing practices;
- ▶ Thirteen trainees suffered smoke inhalation when staff functioned smoke grenades in a tunnel;
- ▶ Tripflare was set up on the steering wheel, resulting in destruction of vehicle; and
- ▶ The relatively large number, and the nature thereof, of the accidents and incidents categorized as deliberate deviations tend to suggest that there may be an overall lack of concern for issues related to ammunition and explosives safety.

<sup>2</sup> In 2008 a new system of classification for cause categories and contributing factors was used in DAER. Establishing a new system at the national level will be part of the program of work for 2009.

Pursuing this theme more deeply, it was noted that very few occurrences were reported in relation to CLS force generation activities. Given the very high volume of ammunition and explosives used and the very high tempo of training in Canada and elsewhere, the numbers appear to be very low – suggesting that not all occurrences are being reported by the various units (for which there is anecdotal evidence). Of the few incidents and accidents reported, many were deliberate deviations, while some other incidents had the potential to become serious accidents. For example:

- ▶ Intact fuze and warhead (missing nose cone) returned in salvage;
- ▶ Uploaded EOD Bison parked in bivouac area in accommodation area;
- ▶ Incorrectly supervised range clearance conducted by a unit and UXO transported; and
- ▶ Improperly loaded vehicle spilled load onto the road.

Taken overall, there is reason to be concerned that ammunition and explosives safety is getting less than adequate attention, due to the high operational tempo and the focus on throughput of personnel and units.

On a wider basis, there is similar concern for Land units deployed on operations. Overall activity is up, ammunition usage is up, yet report numbers have fallen. Suicides and negligent discharges have occurred in Afghanistan that have gone unreported to the Ammunition and Explosives Safety Program. Of the 35 reports emanating from CLS units, 14 (40%) were released 4 or more days after the occurrence (target is 12 hours). Five were released only after 50 or more days. With respect to deployed operations, of the four occurrences, three were reported after 18 or more days. This slowness in reporting is not attributed to dealing with other priorities and then reporting as time allowed: it is attributed to the diligence of ammunition staffs that have pursued units once they have picked up on rumours or reports of injury or damage from other sources.

The apparent mindset of not reporting accidents and incidents in a timely fashion needs to be further looked at and will require leadership intervention to stress the importance of timely reports, along with CF410 Report of Ammunition Defects and Malfunctions reports, which are for the basis for identifying corrective actions when necessary and may eventually save lives. A Culture of Reporting needs to be further developed and enhanced.

L1 or Command Responsible for Reporting	2008 Accident Summary	Date
CLS	While removing foil wrapping from parachute flares, member set down an unwrapped flare. Flare functioned hitting soldier in the chest, causing burns to his forehead and jacket.	2008-01-09
CMS	Finger crushed between the canister and the launcher assembly as the canister was being lowered into it.	2008-01-28
CMS	During de-ammunitioning, member was struck above the right eye with an empty 57mm ammo container while passing it up the ladder from the 57mm magazine to the focsle.	2008-02-04
CLS	Soldier stuck his head and hand around the corner of the wall to see the grenade detonate and was struck by a fragment on the right thumb.	2008-03-14
CLS	Member suffered a foot injury after firing 81mm mortar while his foot was underneath the base plate.	2008-03-19
CLS	Horseplay and mishandling of a Thunderflash resulted in functioning while in vest pocket.	2008-05-02
CLS	Grenade Hand Smoke was accidentally functioned while being carried in a tactical vest pouch.	2008-05-04
CAS	Slight injury to member's hand when throwing practice grenade. Initially attributed to premature initiation of Fuze M228, later attributed to throwing technique.	2008-05-08
CLS	Five vehicles, G Wagon type, damaged during live firing. Damage occurred during convoy exercise and ambush drills wherein vehicles were to be used as static points of fire.	2008-05-08
CLS	Trip flare set up on the steering wheel of decoy vehicle during exercise burnt out the complete interior of vehicle upon functioning.	2008-05-20
CEFCOM	Grenade Sound and Flash 9 Banger accidentally went off inside a LAV III injuring 3 soldiers. It had been placed on the back deck by the air sentry. While another soldier was climbing on the vehicle, he stepped on it. His weight was sufficient to force the safety pin through the plastic fuze body while remaining attached to the fly off lever. Grenade fell into vehicle.	2008-06-01
CANSOFCOM	During training with blank ammo, a soldier found a magazine on the ground, loaded it in his rifle and fired a shot. He then realised that the magazine contained ball ammo.	2008-06-08
CLS	Member burnt when he cut open an Artillery Simulator and ignited the photoflash powder with a lighter.	2008-06-12
CMS	Premature detonation of a DM211 caused damage to the forecastle and bridge panel with excessive ringing of ears to 5 members.	2008-07-29
CLS	Subsequent to .50 cal GPMG stoppage, member lifted the feed cover and discovered a jammed round. While removing the round, it functioned, injuring both crew members.	2008-08-08
CEFCOM	Member received shrapnel from a C13 Frag Grenade on the toe of his right foot while training on the range. Expedient shelter had not provided complete cover.	2008-09-23
CMS	Member injured when troubleshooting misfired NEUTREX. Member had been trained using RMI and not TEODOR and had had only a dry practice run the day before the exercise.	2008-09-30
CLS	Grenade hand smoke C8 was used inside a tunnel on the obstacle course. 13 people suffered from smoke inhalation, 3 of them hospitalised.	2008-11-08
CANOSCOM	Artillery Simulator was functioned inside a mailbox.	2008-11-23

NOTE 1 – Originally reported in FSOMS

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NOTE – Greyed out cells indicate deliberate deviation

L1 or Command Responsible for Reporting	2008 Incident Summary	Date
CLS	Improperly supervised range clearance resulted in the recovery of live ammunition. (Should have been a post firing range sweep, not a range clearance.) Not reported in 2007.	2007-05-25
CMS	Ship received box of 20mm with a fraction tag showing qty 79. Box contained full quantity of 100. Not reported in 2007.	2007-08-13
CANSOFCOM	Weapon damage caused the functioning of a Cartridge (Ctg) 12.7mm before it was chambered. Rivet from feed tray came loose and slipped behind round to be chambered. The casing exploded open in the feed tray with the link still attached.	2008-01-09
CMS	Line handler accidently activated Marker Man Overboard while shifting ship. Smoke candle was activated.	2008-01-11
CMS	MP5 weapon with loaded magazine was lost over the side at sea while conducting boarding operation (member fell into sea and lost weapon while submerged).	2008-01-23
CMS	As member was throwing a heavy line to the jetty, a magazine containing Ctg 5.56mm Blank Line Throwing fell out his pocket and into the water.	2008-01-24
CMS	Diving team failed to secure Signals Diver Recall.	2008-01-29
CANSOFCOM	Breach of Transport of Dangerous Goods Regulations during shipment within USA.	2008-02-01
CAS	After an ASA mission and returning to base, a forward fin on AIM-7 was found not aligned with airstream. Note 1.	2008-02-04
CANOSCOM	Exercise torpedo was launched but did not start. Recovered, it was packed for transport. When unpacked it was determined that the propellant had been initiated sometime after it was packed. Propellant burned in combustion chamber when the torpedo was in the container.	2008-02-08
CMS	8 Marker Man Overboard expended during 2 different false alarms.	2008-02-12
CMS	Weapon jam of .50 Cal was attributed to manufacturing defect of cartridge.	2008-02-12
CMS	During rough seas, qty 1 Marine Marker Man Overboard was activated.	2008-02-18
CLS	7.62mm Ball and Blank were found in a Bison during an exercise. Error attributed to base ammo facility having packed both into same outer pack.	2008-02-19
CMS	Several items suspected to be live were found at a museum. Some were live, some inert.	2008-02-19
CLS	Caps Blasting Non-electric No 12 improperly stored.	2008-03-03
CMS	Port torpedo magazine flood system was accidently activated.	2008-03-04
CLS	9mm Ball found mixed in a box of 9mm Dummy during weapons handling training. Ammunition had not been inspected prior to issue to students. On receipt, student inspected and found fault. (Round, having been found in desk drawer, had been placed in a box of DUMMY rounds. Another member made the issue without first inspecting rounds.)	2008-03-06

L1 or Command Responsible for Reporting	2008 Incident Summary	Date
CMS	Accidental discharge at the range into butts. Improper application of drills.	2008-03-07
CEFCOM	Accidental discharge of 76mm Smk RP. Untrained member neglected to remove all cartridges prior to testing firing system. Weapon system had not been unloaded prior to parking. Fired cartridges burned without causing damage.	2008-03-09
CMS	Dud Thunderflashes found in an amnesty box.	2008-03-12
CMS	Accidental discharge of 5.56mm while conducting clearing procedures.	2008-03-13
CLS	Member improperly retained SAA, pyrotechnics, propellant, and munitions scrap following training exercises.	2008-03-13
CMS	Accidental discharge of 5.56mm. All rounds fired into water.	2008-03-16
CLS	7.62mm breech explosion attributed to weapon fault.	2008-03-17
CAS	While removing Marker Location Marine (MLM) from plastic shipping container, static discharge occurred between fingers and base of MLM. Note 1.	2008-03-19
CAS	Passenger in possession of one smoke and two fragmentation grenades onboard aircraft. Due to VIP interaction with passengers, MP missed querying several passengers. X-ray scanner at airport was not serviceable and not all the load was screened and inspected. Note 1	2008-03-19
CMS	Loading of torpedoes on ship was being carried out when standby tug departed scene. Fleet Ammunition Inspector (FAI) halted loading.	2008-03-25
CMS	Signal Distress Day and Night lost during a diving exercise.	2008-03-30
CMS	Pre-packed and sealed box of Comet flares found to be missing one flare.	2008-03-31
CAS	During inspection of SMDC line, scratches in the metal were found within 2 inches of the ferrule. Attributed to wrench slip during installation or de-installation. Note 1.	2008-04-02
CMS	Sealed box of 20mm with a fraction tag showing qty 66 found to contain qty 79.	2008-04-06
CMS	Signal Distress Day and Night lost during a diving exercise.	2008-04-07
CMS	Accounting shortage of one Signal Distress Day/Night was attributed to having been lost during diving exercise. As the Magazine Yeoman had not been embarked during exercise, shortage was not noticed at time of exercise.	2008-04-17
CMS	Dud Thunderflash was found in a garbage can in dispersal area after ENDEX.	2008-04-20
CMS	Dud Thunderflash was found in main cafeteria can after ENDEX. Investigation confirmed it had been in cafeteria at least 10 hours before being discovered/reported.	2008-04-20
CMS	Suspected live Small Arms Ammunition found in museum proved to be inert but improperly marked.	2008-04-20



L1 or Command Responsible for Reporting	2008 Incident Summary	Date
CMS	Civilian contractor flooded a locker while conducting water flow test without proper approval. No ammo was damaged.	2008-04-22
CMS	Mechanical failure damaged a 57mm Prac (BLP) during transfer through the feed system.	2008-04-23
CMS	2 containers holding 3 MLM each were found with rainwater in them. Containers had been positioned on the bridge wings or at life buoy sentry position.	2008-04-23
CMS	Weapon jam with 20mm due to misaligned rounds when transferred from exit unit to loader unit.	2008-04-23
CAS	While arming the ejection seat, the technician installed the drogue gun cartridge into the seat initiator cartridge position which damaged the drogue gun cartridge. Packaging of cartridges was not as per SOP and technician failed to note deviation when extracting cartridges for installation. Note 1	2008-04-28
CLS	CIED bison was parked in the center of the camp plugged in for charging and still loaded with explosives.	2008-05-01
CMS	Grenade Hand Smoke Yellow found in the QM during a warehouse clean up.	2008-05-01
CLS	Intact fuze and warhead (w/o nose cone, piezo-electric crystals and no visible wires) was found in a salvage cage.	2008-05-01
CLS	Breach of safety regulations/distances regarding field storage. Planning and execution did not account for safety of personnel. Ammunition stored between sleeping area, maintenance area and POL.	2008-05-01
CMS	20mm ammunition was exposed to RF radiation for approximately 5 minutes at approximate range of 8 meters.	2008-05-04
CANOSCOM	Simulator Artillery Flash M21 (American issue) found in returned salvage following exercise in the US.	2008-05-05
CAS	When replenishing the aircraft a damaged flare was discovered. Damaged flare was placed in the ready-use storage area instead of calling EDF to dispose of same. Note 1.	2008-05-06
CMS	11 out of 12 Comet flares in a C121 container were found with salt and rust accumulation and stains.	2008-05-12
CLS	Grenade Hand Smoke left in glove compartment of vehicle while vehicle went for repairs at a civilian garage in town.	2008-05-12
CMS	Comet flares and Flares Hand Pinpoint Red found during inspection in an unlocked smoke locker.	2008-05-13
CLS	Subsequent to exercise, large number of dud Artillery Simulators were not properly disposed. Items were trod upon and driven over. When advised to secure area for later disposal by Base staff, unit gathered items into piles which were recovered by Base staff. Later, a further number were discovered in salvage bags.	2008-05-14

L1 or Command Responsible for Reporting	2008 Incident Summary	Date
CLS	Qty 113 Grenade Hand Smoke Screening were found in training area. Area had been marked as containing UXO, but all had safeties in place.	2008-05-17
CMS	Chaff magazine accidentally lightly sprayed with salt water for about 20 sec.	2008-05-17
CLS	Various SAA and pyrotechnics were found in possession of military member in PMQ.	2008-06-01
CEFCOM	Grenade Sound and Flash 9 Banger accidentally when off outside a LAV III. It had been placed on the back deck by the air sentry. While another soldier was climbing on the vehicle, he stepped on it. His weight was sufficient to force the safety pin through the plastic fuze body while remaining attached to the fly off lever.	2008-06-01
CANOSCOM	Warhead and control group fell off a trolley onto the floor when moved contrary to established procedures	2008-06-03
CAS	Live CAD was found mixed in with expended CAD's. Note 1.	2008-06-03
CMS	Ready use locker containing various type of ammo was accidentally flooded.	2008-06-04
CMS	Member did not follow proper activation procedures which resulted in 3 Markers Location Marine thrown overboard and not functioning.	2008-06-09
CMS	Loaded magazine (5.56mm Blank) fell into the harbour and could not be recovered.	2008-06-18
CMS	During inspection of dummy and display, it was discovered that qty 5 Ctg 9mm Dummy had been lost during reorganization of SQMS workspace.	2008-07-09
CMS	Qty 3 57mm damaged due to weapon jam.	2008-07-14
CLS	Live ammunition items found in large shipment of salvage and scrap metal sold to industry. Shipment bought back and scrap yard cleared.	2008-07-16
CLS	Improper loading of vehicles (caps not tightened and some straps had been cut and not replaced) resulted in one 105mm round from each of two trucks falling onto road. Rounds found by third driver.	2008-07-18
CMS	Accidental discharge of 9mm Ball from SMG during unloading and proving. Round seen to impact water.	2008-07-20
CMS	As the jumping ladder was lowered, it hit a Marker Man Overboard knocking it off its mounting bracket causing it to be expended.	2008-07-24
CLS	Trainee had HMG stoppage. After conducting Immediate Action drills, he noticed the barrel extension was cracked.	2008-07-29
CMS	During upload of rounds, loading error (operator error) occurred and two 57mm rounds were damaged.	2008-08-04
CMS	Civilian workers inadvertently activated a Marker Man Overboard while installing protective sheeting.	2008-08-06

L1 or Command Responsible for Reporting	2008 Incident Summary	Date
CLS	Military Police discovered live ammunition and pyrotechnics during the search of a residence. Member had illegally retained ammunition on one or more occasions after a training exercise.	2008-08-08
CAS	During SUU-5003 downloading after flight, the technician discovered that the cone was missing on one of the six MPB's. Note 1	2008-08-14
CMS	During magazine rounds, a Day and Night signal was found to have a cracked cap on the smoke end, allowing moisture to mix with the chemical content.	2008-08-19
CMS	5.56mm cartridge fell from magazine into the sea as magazine was being inserted into weapon.	2008-08-22
CMS	During unloading a 76mm round was inadvertently rammed into the breech. During removal, the projectile separated from its casing rendering the round unserviceable.	2008-08-25
CAS	2 canisters, each containing a Marker Location Marine (MLM), were recovered from a returning aircraft and returned to stores. When being used for flare replenishment of another aircraft one MLM was found to be armed. Note 1	2008-08-25
CMS	The lower fin of a Torpedo MK46 was damaged during unloading from the SVTT.	2008-09-07
CMS	Marker Man Overboard was accidentally activated when struck by berthing line while vessel was proceeding to sea.	2008-09-11
CMS	Accidental discharge of a Ctg 5.56mm Blank. Member was recent arrival who had not had weapons refresher for 18 months and had not been assessed for weapons handling proficiency.	2008-09-13
CMS	Ship took an unexpected roll and thirty 76mm rounds fell from canisters. One round damaged. Others returned to canisters when all should have been quarantined and returned to CFAD for inspection.	2008-09-16
CLS	Unauthorized retention/possession by one member of various expended and live ammunition items. Discovered during routine inspection of the barracks.	2008-09-18
CLS	A commercial trailer carrying CF ammunition went off the road during an accident. Minor pallet damage only and was munitions were recovered and transported to Petawawa. Noted that various Dangerous Goods (Ammunition, hydrochloric acid, nitric acid and methanol) had been transported together.	2008-09-23
CAS	One Marker Location Marine was improperly transported.	2008-09-24
CLS	Range Control found an M19A1 can with an expended Simulator Projectile Ground Burst taped to the bottom of the can. There was also evidence that another explosive item had functioned inside the can.	2008-09-28
CLS	Live ammunition transported with range scrap - and all mixed together. Single vehicle for two vehicle task.	2008-09-30
CMS	Accidental discharge of a 57mm.	2008-10-03

L1 or Command Responsible for Reporting	2008 Incident Summary	Date
CLS	Live Thunderflash without its cap was discovered taped to the handle of an expended Thunderflash - an attempt to improperly destroy one Thunderflash with another. Discovered inside a bag of salvage.	2008-10-03
CMS	2 full 9mm Sig Sauer magazines were lost in the water during search and rescue exercise. Survival vest pocket was found to be damaged.	2008-10-06
CMS	During muster a 5.56mm Ball round could not be accounted for. Subsequently discovered in a floater jacket pocket.	2008-10-23
CLS	Member tried to board a flight with four C7 magazines and 102 rounds of Ctg 5.56mm Ball. He was arrested and detained by airport security.	2008-10-24
CAS	A Servicing line truck was found parked inside 7 Hangar with 35 Marine location Markers inside the truck box. The truck did not have any Dangerous Goods placards displayed.	2008-10-24
CLS	A MLVW Gun Tractor loaded with various types of 105mm ammunition rolled over.	2008-10-25
CANOSCOM	Two different C7 rifles discharged a single Ctg 5.56mm ball each after being put on safe and prior to the unload. Unit reported two cases of possible cook-off. Unable to clearly establish what happened due to time delay in reporting.	2008-10-25
CLS	MLVW loaded with various type of ammunition went off the road. Load had not been secured at the back of the vehicle. Ammunition was inspected and deemed serviceable.	2008-10-30
CMS	Compatibility groups D and G were stored together in a pyrotechnic locker.	2008-11-10
CMS	Use of improper drills resulted in two dud Comet flares.	2008-11-12
CAS	Contractor delivered explosives and detonators together, contrary to Transport of Dangerous Goods Regulations.	2008-11-14
CAS	Wrong NEQ used on the shipping documents resulted in the fact that no placards were used when they should have been.	2008-11-14
CMS	Member dropped a loaded C7 magazine on the catwalk. When he picked up the magazine, one round fell through the catwalk into the water below and was lost.	2008-11-23
CANOSCOM	Member failed to clear the wall when throwing a grenade, which felt back in the bay and functioned as intended. Bay had been cleared and nobody was injured.	2008-11-25
CMS	Four 1 Min Smoke Markers found stored in a filing cabinet with no ammunitions and explosives storage licence.	2008-11-28
CMS	One 20mm cartridge found missing upon return from ship to CFAD.	2008-12-04
CAS	Accidental discharge of 5.56mm Blank into a clearing bay.	2008-12-08

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