



CEN Workshop 10 – European Handbook for Defence Procurement

Expert Group 19 : Disposal of Munitions

Final Report

Brussels, June 30, 2011

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2- Reference

NATO Glossary AOP 36-38

3- Introduction

The European Commission requested the European Committee for Standardization to establish Workshop 10 to improve the efficiency and enhance the competitiveness of European Defence Industry. Eight Experts groups have been set up in February 2007 with the objective to extend the applicability of EHDP.

The European Handbook for Defence Procurement, EHDP, has been prepared by Experts Groups reporting to CEN Workshop 10. This document is a guide designed as a tool for anyone involved in the European defence procurement contractual negotiations.

The primary target audiences for the Handbook are:

- The staff in the ministries of defence who are producing procurement specifications and invitations to tender
- The staff in defence companies who are responding to those requirements

EHDP is designed to provide Defence Procurement Agencies and Defence Industries with a preferential list of selected recommended standards qualified as best practice ones to be included in armament contracts together with concise recommendations for an optimum use of those standards in such a Defence Procurement context.

Those types of resulting informative data could be used in the acquisition process by MoD and in the development process by Industry such that system will be built faster, better and cheaper.

The aim of a recommendation is to develop good practices in the domain addressed by the Expert Group and to assist the final user in using recommended best practices standards in the best cost-effective way, increasing the controlled use of existing standardization, a necessity to harmonise European practices used by defence procurement stakeholders.

- The objective is to deploy a common approach through Nations Procurement agencies about an optimized utilization of standards : civil ones and military ones, the possible limitations of civilian standards with respect to military applications,... to provide a useful guide to all stakeholders involved in defence procurement process
- Description of how to implement standards successfully in armament contracts
- The overall result will be a better use of standards in armament contracts

Recommendations are, during the drafting process, designed to allow EHDP final users to be provided with the right information for timely and quickly acquiring the best control in writing standards clauses related to the selected material, in armaments contracts. That's why the volume of recommendations will be accordingly fully compatible with respect to EHDP vocation and purpose.

The European Commission has mandated the European Standardisation Organisation CEN to screen and to compare the existing national and international standards related to defence procurement and to give recommendations for preferred application in future.

CEN BT 125 has initiated a CEN Workshop (WS 10) to create a European defence procurement standardisation handbook. As a first activity, a number of European national Ministries for Defence have described their national procurement process and have compiled a database of widely adopted standards used in this procurement process. As a next step eight priority areas were identified for more detailed review by expert groups. The task of these groups was to compare the technical content of various standards with the aim of recommending a reference for European defence procurement. In Phase 2, 8 more priority areas were defined and reviewed. Now in Phase 3 the priority areas from Phase 1 are updated and reviewed and a further 3 areas were added. One of these is the area of 'Disposal of Munition.

The safety of Munitions and Explosives is of fundamental importance to the military user and to the public at large, during all the life cycle. The armed forces have a responsibility to handle, store and transport their munitions and explosives in a safe manner and in compliance with international and national agreed legislation. Even in time of military conflict, it is essential to minimize the risk of munition or explosive accidents so as to prevent loss of own forces lives and assets.

Furthermore environmentally friendly and safe disposal of munition and explosive containing items is becoming increasingly important.

4- Scope and presentation of selected best practice standards (see doc N0027Rev2.xls to be filled)

EG 19 scope relates to (Best Practice) Standards for the disposal and the demilitarisation of munitions. All types of munitions are included except nuclear, biological, chemical (NBC) and historical munitions which are not part of the scope of this working group.

New developments, such as 'Green Munitions', will not be considered. For these potential new types of munitions it will be necessary to update this report if new standards are developed.

The decisive EG 19 scope is only munitions with an emphasis on energetic materials. The demilitarisation of weapons itself will not be considered.

Furthermore, an important amount of considerations are dedicated to the job breakdown in disassembling military munitions and the separation of the various components. The main concerns all along the different steps are:

- Safety for personal and infrastructure
- Environmental
- Technical level
- Security of sensitive equipments
- Traceability of the equipments and the materials

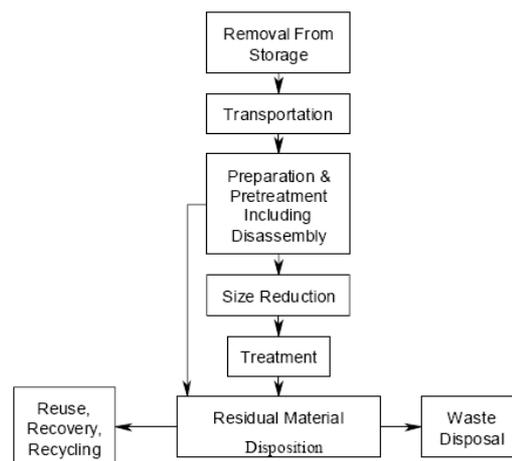


Figure 1. Demilitarization and Disposal Process

Brief description :

a. Removal from Storage: The demilitarization and disposal operation starts with collecting the munitions in suitable lots depending on the type of munition. The munition must be labelled, controlled, and packaged as would be done for any other munition of its type. The munition may then be transported and shipped to the organization or contractor responsible for the demilitarization and disposal operation.

b. Transportation: Depending on the storage location of the munition and the location of the demilitarization and disposal process site, various international military or civilian regulations for transportation will need to be followed, especially if the transport involves crossing national or state borders.

c. Preparation and Pretreatment: Munitions to be removed from military service use often involve a variety of materials, some of which are safe and harmless, such as packaging materials and steel casings, and other materials, such as explosives and fuels, that are hazardous. To the extent possible, all harmless materials must be separated from hazardous

materials to minimize cost and the total quantity of material needing further treatment. After separation, packaging materials, wood, paper, and metals should be collected for recycling, incineration, or disposal according to the regulations for solid waste. Special attention must be paid to materials that require special treatment and disposal. Munitions should be safely defused, should have all hazardous materials removed, and should be disassembled into their basic components. The disassembly process will likely follow in reverse order the assembly procedures used in the production of the munitions. All hazardous materials should be identified for treatment by type. For example, igniters, fuzes, batteries, heavy metals (such as lead and mercury), asbestos insulation material, and liquid fuel might result from the disassembly of missiles.

d. Size Reduction: The size and volume of a complete munition can usually be reduced by separating explosive warheads, rocket motors, and other large sections that contain hazardous materials; mechanical sectioning, laser grooving/curling, water jet cutting, cryofracture, washout, or meltout processes are possible techniques. Whatever hazardous material or components containing hazardous material are left must be prepared and transported for treatment or disposal.

e. Treatment: According to the type and nature of the hazardous material at hand, special treatment must be carried out as either recycling or as waste handling. Several options for recycling, reuse, and recovery of explosives, metals, and other materials exist and have to be analysed case by case. Options that provide the most advantageous cost benefit, such as recovery of explosives for industrial reuse, will usually be chosen and the products have to meet the specific specifications for the considered application. Reuse, Recovery, and Recycling: The demilitarization and disposal options resulting in the highest degree of recovery, recycling, and reuse of the most valuable materials will usually be preferred. Because of the release of environmentally harmful by products from the recovery process, however, the highest degree of recovery is not always the most attractive goal from an integrated environmental point of view.

g. Waste Disposal: After completing the preceding steps, cognizant personnel and authorized facilities must dispose of any inert materials remaining that can not be used or that consist of environmentally harmful substances. Harmless inert substances usually can be disposed of at landfills, but hazardous compounds must be disposed of at controlled landfills or be subjected to special treatment and disposal

The EG 19 will not consider what is to happen with the disassembled products of the demilitarisation process.

5- Historical background

There are a few international standards like STANAGs that partially cover the field “disposal of munitions”.

In addition to these STANAGs there are a set of European regulations. But these regulations are not exclusively concerned with munition disposal. In the field of European regulations explosive for civil uses, environmental protection, REACH regulation, CLP regulation , main hazards are influencing the disposal of munitions activities.

At the national level there is a lack of standards relating specifically to disposal of munitions.

The main contribution of the EG 19 was to consider in detail these existing documents (standards, regulations...) and to compile them.

The main recommendation of the EG 19 will be to consider the creation of an international standards document –a Best Practice Standard- for the Disposal of Munition.

Since the group limited itself to the issue of disposal and not to issues such as the reconciliation of the products of the disposal process, the recommendation for an international standard will also be limited to this subject matter.

Furthermore EG 19 decided not to deal with safety standards for munitions. This would have been only appropriate in a context of revalorising and recycling end products of munition disposal.

But these safety standards have been considered in detail during Phase I, II and III of the WS 10 by the working groups EG 2 ‘Energetic materials’, EG 8 Environmental Testing’ and EG 10 ‘Munition’.

A certain amount of standards have been evaluated during the 3 phases of the WS10 but none of these cover fully the subject of interest of EG 19.

6- Reduction process

Due to the very limited amount of standards covering the subject, there has been no reduction process but simply a comparison of the few existing standards and an evaluation of the contents in order to determine what could be adequate best practice.

EG 19 decided to add a set of regulations partially relevant for the disposal of munitions, in order to complement the lack of standardisation documentation in the field.

7- Recommendations of standards

Recommendation(s)
<p><i>Standard: Identification, scope and information on the source</i></p> <p>STANAG 2818 : CHARACTERISTICS OF DEMOLITION ACCESSORIES TO DETERMINE THEIR OPERATIONAL INTERCHANGEABILITY</p> <p>Related document : AOP 31 “DEMOLITION MATERIAL ; DESIGN PRINCIPLES” & AOP 32 “DEMOLITION MATERIAL ; ASSESSMENT AND TESTING OF SAFETY AND SUITABILITY FOR SERVICE”</p> <p>Scope: The aim of this agreement is to standardize the following, for new demolition materiel to be used for NATO armed forces:</p> <p>a. design principles and criteria for safety and suitability for service (AOP-31), and b. methods for testing and assessment of safety and suitability for service (AOP-32).</p> <p>Source: www.nato.int/nsa</p>
<p><i>Why chosen as best practice?</i></p> <p>This agreement permits :</p>

- a. to ensure appropriately the safety and suitability for service, and
- b. to standardize design, testing and qualification of the materiel and to avoid duplication of analysis and tests of demolition materiel supplied by another nation or service.

AOP 31 provides principles and criteria applicable to the safety and suitability for service in the design of demolition materiel. Demolition systems comprise all hardware and software necessary to execute a demolition mission. In relation to the complexity and the varieties of these systems and the need to adapt their deployment to each mission, demolitions systems are normally subdivided into subsystems and parts of subsystems. The full description and the functional requirements are available in the core of the document Design requirements for safety are given in annex B of the document

The use of this publication is not limited to design assessments of safety and suitability for service. It also provides guidance for the development process, growth of reliability and safety, establishment of maintenance procedures and munition surveillance programs, and evaluation of modifications of previously qualified demolition materiel.

AOP 32 gives guidelines for the assessment of the safety and the suitability for service of demolition materiel, the preparation and the conduct of the related testing and the evaluation of the test results. It gives methods and test methods with statistical elements.

As required by STANAG 2818, methods and procedures for analyses, tests and assessments in this publication are established in accordance with the requirements for safety and suitability for service as laid down in AOP-31 and in the particular product specifications. These shall be applied for new demolition materiel submitted for qualification.

The description of demolition systems and short descriptions of principal demolition items (stores and accessories) are presented in AOP-31.

How to use it (them)

The guidance provided in the document has to be applied.

Excluded from this agreement are:

- a. nuclear munitions and nuclear devices;
- b. demolition materiel, intended for demolitions other than by means of explosives (e.g., by fire, water or mechanical means);
- c. improvised explosive devices;
- d. booby traps; and
- e. training devices which contain explosive materials

What is missing?

No specific items recognized

Recommendation(s)

Standard: Identification, scope and information on the source

STANAG 4315 : NATO AGEING AND LIFE TIME TEST PROCEDURES FOR MUNITIONS or THE SCIENTIFIC BASIS FOR THE WHOLE LIFE ASSESSMENT OF MUNITIONS

Related document : AOP 46 “THE SCIENTIFIC BASIS FOR THE WHOLE LIFE ASSESSMENT OF MUNITIONS – Guidelines for STANAG 4315”

Scope: The aim of this agreement is to give guidelines on the management and scientific basis of the processes used to assess the life of munitions.

Details of the agreement are included in AOP 46 which gives a description of the procedure for the whole life assessment of munitions and gives guidance on the failure modes and degradation mechanisms of energetic materials.

Source: www.nato.int/nsa

Why chosen as best practice?

This agreement permits to guide engineers in the methods of characterisation of life cycle of munitions.

Participating nations agree that AOP 46 provides a suitable basis for the whole life assessment of munitions. In particular failures associated with degradation of energetic materials are explained and a methodology for assessing munition life is presented.

This document provide method to evaluate the degree of safety for energetics which have past their qualified life time and allows to estimate the margin of safety according to the real environment that they have encountered.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

No specific items recognized

Recommendation(s)

Standard: Identification, scope and information on the source

STANAG 4518 : SAFE DISPOSAL OF MUNITIONS, DESIGN PRINCIPLES AND REQUIREMENTS AND SAFETY ASSESSMENT

Related document : none

Scope: The aim of this agreement is to standardise design safety principles, design safety requirements and the assessment process for the safe disposal of munitions. In this STANAG, the term “demilitarization” refers to the act of removing or otherwise neutralizing the military potential of a munition. Such neutralization is to be carried out in a safe, cost effective, practical and environmentally responsible manner.

Source: www.nato.int/nsa

Why chosen as best practice?

Demilitarization is a necessary step for military items prior to their release to a non-military setting. The term “disposal” refers to end-of-life (EOL) tasks and actions for residual materials resulting from demilitarization operations. Disposal encompasses the process of redistributing, transferring, donating, selling, abandoning, or destroying military munitions. Annex C gives example of Demilitarization and Disposal Plan.

Growing international awareness of ecological issues and the environmental impact of industrial waste disposal processes have caused member nations to examine programs and processes concerning the demilitarization and disposal of munitions. Contributors of this increased attention include more stringent international environmental legislation such as that listed in Annex B, the desire to preservation natural resources, the desire to reduce waste, and limited space and locations for disposal. Because legislation is likely to become more stringent in the future, plans and processes used in the demilitarization and disposal of munitions will need to be carefully crafted and be reviewed continually in the light of new legislation and advances in technology. The focus of demilitarization and disposal is escalating from using techniques that are safe, efficient and cost effective to ones that are environmentally acceptable, physically safe, free of health hazards, practical, and cost effective. Nations are being urged to move from disposal processes that rely on destruction toward those that maximize the recovery and reuse of component materials.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

No main specific items recognized but it could be implemented with details in the method of evaluation and required points.

Recommendation(s)

Standard: Identification, scope and information on the source

STANAG 2143 : EXPLOSIVE ORDNANCE RECONNAISSANCE/EXPLOSIVE ORDNANCE DISPOSAL (EOR/EOD)

Related document : none

Scope: The aim of this agreement is to provide the foundation for standardization in the field of Explosive Ordnance Reconnaissance/Explosive Ordnance Disposal (EOR/EOD).

Explosive Ordnance (EO) can pose a threat to NATO operations across the Spectrum of Conflict. The threat can include a mixture of EO used by enemy forces, former belligerents and/or NATO nations. Therefore, any or all of the types of EO as defined would affect NATO Armed Forces.

Source: www.nato.int/nsa

Why chosen as best practice?

EOD operational capabilities are to detect, nullify or dispose of EOD incidents which by their existence, impair the flexibility of manoeuvre of combat units, disrupt lines of communications,

degrade morale, or paralyse industrial complexes, seaports, waterways, air bases or population centres. While EOD operations extend throughout the rear areas and forward combat areas, it must be realised that the existence of EOD incidents in civilian areas will often have serious repercussions on the military situation.

In such cases cooperation between military EOD units and national military and civilian agencies will be essential and will be accomplished through the Combined Joint EOD Cell (CJEODC) and the Multinational EOD Coordinating Cell (MNEODCC).

This agreement is intended to provide the basis for national EOR/EOD organization. It is evident that this planning is in concurrence with NATO and national operational planning. This agreement does not grant any additional powers to the NATO Armed Forces with respect to civilian authorities and civilian responsibilities.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

No specific items recognized

Recommendation(s)

Standard: Identification, scope and information on the source

STANAG 2221 : EXPLOSIVE ORDNANCE DISPOSAL REPORTS AND MESSAGES
Related document : AEODP-06 “EXPLOSIVE ORDNANCE DISPOSAL REPORTS AND MESSAGES”

Scope: The aim of this agreement is to register national acceptance of AEODP-6

Source: www.nato.int/nsa

Why chosen as best practice?

The aim of AEODP-6 is to collect all reports and messages concerning Explosive Ordnance Reconnaissance and Explosive Ordnance Disposal into one publication.

AEODP-6 contains the following messages.

- a. EOD INCIDENT REPORT (EODINCREP)
- b. EOR TASKING OR EOR REPORT (EORTASKREP)
- c. EOD TASKING OR EOD REPORT (EODTASKREP).

It was decided that 3 reports would be required as follows:

- a. EODINCREP to be a report which is submitted to a specialist EOD cell by non-specialists (not necessarily an observer report, may be battalion level input to divisional EOD cell, for example). This report should provide sufficient information to enable EOR tasking priorities to be made.
- b. EORTASKREP for EOD tasking authority to task specialist EOR and for EOR team to add details determined from reconnaissance. Details should be sufficient to enable EOD tasking authority to make priorities and task EOD teams.
- c. EODTASKREP for EOD tasking authority to task an EOD team to supply them with available information and to enable the EOD team to report any correction to information,

action taken and results.
How to use it (them)
The guidance provided in the document has to be applied.
What is missing?
No specific items recognized

Recommendation(s)
<p>Standard: Identification, scope and information on the source</p> <p>STANAG 2369 : IDENTIFICATION AND DISPOSAL OF SURFACE AND AIR MUNITIONS</p> <p>Related document : AEODP-3 “PRINCIPLES OF IMPROVISED EXPLOSIVE DEVICE DISPOSAL”, AEODP-5 “EXPLOSIVE ORDNANCE DISPOSAL RECOVERY OPERATIONS ON FIXED INSTALLATIONS” and AEODP-6 “EXPLOSIVE ORDNANCE DISPOSAL REPORTS AND MESSAGES”</p> <p>Scope: The aim of this agreement is to register national acceptance of AEODP-3, AEODP-5 and AEODP-6.</p> <p>Source: www.nato.int/nsa</p>
<p>Why chosen as best practice?</p> <p>AEODP-3</p> <p>This publication outlines the general principles to be adopted when carrying out disposal of Improvised Explosives Devices (IED).</p> <p>It is based on experience gained in many theatres of operation over many years.</p> <p>It is not, and cannot be, a series of hard and fast rules since such rules cannot exist in the IED disposal world. It is produced as an informative guide providing a list of fundamental points and principles based on very wide experience.</p> <p>AEODP-5</p> <p>The term 'installation' used in this publication is taken to include; airfields, ports, logistic and operational facilities of a static or permanent nature.</p> <p>The priority aim of all EOD recovery operations, whatever the installation, is to assist in the overall plan for the recovery of that installation such that it may undertake its primary operational role in the minimum possible time. After the operational priorities, and with time and logistics permitting, the secondary aim is to continue with EOD recovery operations as necessitated by the overall recovery plan of the installation.</p> <p>Regardless of the facilities damaged, it is likely that only limited resources will be available for recovery actions whether they be of an engineering or EOD nature. Thus any recovery plan requires predetermined priorities based on the facility’s Concept of Operations, reasoned assumptions and well integrated training. Since EOD resources may be moved from one installation to another it is essential that basic planning concepts and training are standardized. EOD procedures should also be standardized wherever possible, but actual techniques will vary when undertaken in such differing environments as an airfield, port or logistic depot.</p>

This publication is to provide basic planning concepts which may be utilized on a NATO basis to assist in EOD recovery operations and preparatory training.

AEODP-6

The aim of AEODP-6 is to collect all reports and messages concerning Explosive Ordnance Reconnaissance and Explosive Ordnance Disposal into one publication.

AEODP-6 contains the following messages.

- a. EOD INCIDENT REPORT (EODINCREP)
- b. EOR TASKING OR EOR REPORT (EORTASKREP)
- c. EOD TASKING OR EOD REPORT (EODTASKREP).

It was decided that 3 reports would be required as follows:

- a. EODINCREP to be a report which is submitted to a specialist EOD cell by non-specialists (not necessarily an observer report, may be battalion level input to divisional EOD cell, for example). This report should provide sufficient information to enable EOR tasking priorities to be made.
- b. EORTASKREP for EOD tasking authority to task specialist EOR and for EOR team to add details determined from reconnaissance. Details should be sufficient to enable EOD tasking authority to make priorities and task EOD teams.
- c. EODTASKREP for EOD tasking authority to task an EOD team to supply them with available information and to enable the EOD team to report any correction to information, action taken and results.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

No specific items recognized

Recommendation(s)

Standard (or the set of standards): Identification, scope and information on the source

NATO Allied Ammunition Storage and Transportation Publications 2 (AASTP 2) – Manual of NATO safety principles for the storage of military ammunition and explosives – May

Scope: The primary object of this Manual is to establish safety principles to be used as a guide between host countries and NATO forces in the development of mutually agreeable regulations for the layout of ammunition storage depots and for the storage of conventional ammunition and explosives therein. These principles are intended also to form the basis of national regulations as far as possible

Source: <http://www.nato.int/cps/en/natolive/stanag.htm>

Why chosen as best practice?

There are no specific international regulations or codes of practice that relate directly to the safe storage of ammunition and explosives, this is a national responsibility.

How to use it (them)
The guidance provided in the document has to be applied.
What is missing?
No specific items recognized.

Recommendation(s)
Standard (or the set of standards): Identification, scope and information on the source
IMAS 9.30 Explosive ordnance disposal – October 2008
Scope: This standard provides general principles, specifications and guidelines for the safe conduct of Explosive Ordnance Disposal (EOD) operations as part of a mine action programme. It applies to the disposal of mines and Explosive Remnants of War (ERW) including unexploded sub-munitions. This standard does not apply to the disposal of chemical weapons, munitions with highly toxic or carcinogenic components.
Source: http://www.mineactionstandards.org/imas.htm
Why chosen as best practice?
In terms of stockpile destruction, APM are not very different from the other types of ammunitions. So the general principles are the same for all types of ammunition including APM.
How to use it (them)
The general and useful guidance provided in the document can be applied.
What is missing?
This document must be adapted and more detailed to our specific theme "disposal of ammunition" and not only to mines disposal.

Recommendation(s)
Standard (or the set of standards): Identification, scope and information on the source
IMAS 10.10 Safety & occupational health -General requirements – October 2001
Scope: This standard provides specifications and guidance for the development and implementation of Safety and Occupational Health (S&OH) systems for use in mine action
Source: http://www.mineactionstandards.org/imas.htm
Why chosen as best practice?
In terms of stockpile destruction, APM are not very different from the other types of

ammunitions. So the general principles are the same for all types of ammunition including APM.
How to use it (them) The general guidance provided in the document can be applied.
What is missing? This document must be adapted and more detailed to our specific theme "disposal of ammunition" and not only to mines disposal.

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>IMAS 10.50 Safety & occupational health -Storage, transportation and handling of explosives – October 2003</p> <p>Scope: This standard provides specifications and guidelines for the safe storage, transportation and handling of explosives used by demining organisations. This standard does not specifically apply to bombs, rockets, projectiles, UXO or any other heavily encased explosives although certain sections do refer to ammunition or can be applied to the storage, transportation and handling of ammunition.</p> <p>Source: http://www.mineactionstandards.org/imas.htm</p>
<p>Why chosen as best practice?</p> <p>In terms of stockpile destruction, APM are not very different from the other types of ammunitions. So the general principles are the same for all types of ammunition including APM.</p>
<p>How to use it (them) The general guidance provided in the document can be applied.</p>
<p>What is missing? This document must be adapted and more detailed to our specific theme "disposal of ammunition".</p>

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>IMAS 10.70 Safety & occupational health - Protection of the environment – October 2007</p> <p>Scope: This standard provides guidelines as to the minimum environmental protection measures that should be complied with to ensure that environments affected by survey and demining operations are not degraded by the work and are fitted for their intended use once demining is completed.</p>

While this standard specifically refers to demining operations the requirements outlined equally cover other mine action operations, particularly stockpile destruction.

Source: <http://www.mineactionstandards.org/imas.htm>

Why chosen as best practice?

In terms of stockpile destruction, APM are not very different from the other types of ammunitions.

So the general principles are the same for all types of ammunition including APM.

How to use it (them)

The general guidance provided in the document can be applied.

What is missing?

This document must be adapted and more detailed to our specific theme "disposal of ammunition" and not only to mines disposal..

Recommendation(s)

Standard (or the set of standards): Identification, scope and information on the source

IMAS 11.10 Guide for the destruction of stockpiled anti-personnel mines – October 2003

Scope: The purpose of this IMAS is to explain the background to the stockpile destruction of Anti-Personnel Mines (APM), explain UN policy, identify the technical factors of stockpile destruction and the available technology in order that informed decisions for the disposal of the stockpile elements can be made.

Annex B identifies the demilitarization cycle.

Annex C gives informations about Industrial demilitarization technologies

Annex D gives informations about rotary kiln technology

Annex E gives informations about plasma arc technology

Annex F gives informations about Open Burning and Open Detonation (OBOD)

Source: <http://www.mineactionstandards.org/imas.htm>

Why chosen as best practice?

In terms of stockpile destruction, APM are not very different from the other types of ammunitions.

So the general principles are the same for all types of ammunition including APM.

How to use it (them)

The general guidance provided in the document can be applied.

What is missing?

This document must be adapted and more detailed to our specific theme "disposal of ammunition" and not only to mines disposal..

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>IMAS 11.20 Principles and procedures for open burning and open detonation operations mines – October 2003</p> <p><i>Scope:</i> The purpose of this IMAS is to explain the principles and procedures for the conduct of largescale Open Burning and Open Detonation (OBOD) operations. It includes recommendations for the layout of disposal sites and the contents of Standard Operating Procedures (SOPs) in order to ensure a safe system of work.</p> <p>This IMAS provides guidance for the destruction of stockpiles of explosive ordnance (EO) including Anti-Personnel Mines (APM) by OBOD, it does not cover the destruction of nuclear, biological or chemical weapons.</p> <p>Source: http://www.mineactionstandards.org/imas.htm</p>
<p>Why chosen as best practice?</p> <p>In terms of stockpile destruction, APM are not very different from the other types of ammunitions.</p> <p>So the general principles are the same for all types of ammunition including APM.</p>
<p>How to use it (them)</p> <p>The general guidance provided in the document can be applied.</p>
<p>What is missing?</p> <p>This document must be adapted and more detailed to our specific theme "disposal of ammunition" and not only to mines disposal.</p>

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>IMAS 11.30 National planning guidelines for stockpiled destruction mines – Janvier 2003</p> <p><i>Scope:</i> This Guide establishes principles and provides guidance for the effective national planning and management of stockpile destruction operations of explosive ordnance (EO) including Anti-Personnel Mines (APM). It does not cover planning and management of the destruction of nuclear, biological or chemical weapons.</p> <p>Annex B identifies the destruction process</p> <p>Annex E identifies the Application of ISO 9001 to 2008 stockpile destruction</p> <p>Source: http://www.mineactionstandards.org/imas.htm</p>
<p>Why chosen as best practice?</p> <p>In terms of stockpile destruction, APM are not very different from the other types of ammunitions.</p>

So the general principles are the same for all types of ammunition including APM.

How to use it (them)

The general guidance provided in the document can be applied.

What is missing?

This document must be adapted and more detailed to our specific theme "disposal of ammunition" and not only to mines disposal..

8- Consideration of Regulations affecting disposal of munitions

8.1 International Regulations

Standard (or the set of standards): Identification, scope and information on the source

**UN Recommendations on the Transport of Dangerous Goods - Model Regulations
Sixteenth revised edition – 2009**

Scope: Packaging and ammunitions are subjected to the international regulations related to transport and storage of the dangerous goods :

Transport	Road	Rail	Sea	Air	River
International	ADR	RID	IMDG	OACI / IATA	ADN
	European agreement concerning the international transport of the dangerous goods by road	Regulation concerning the railway international transport of the dangerous goods	International maritime law of the dangerous Maritime goods of the Organization, the amendment 28-96 of 1996	Technical instruction for the safety of the air transport of the dangerous goods	European agreement concerning the transport of the dangerous goods by internal navigation

Source: www.unece.org

Why chosen as best practice?

This document is the reference standard for transport of dangerous goods.
This document gives the basic principles for the Transport of Dangerous Goods

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

No specific items recognized but in the application the required tests and criteria should be

harmonized with the military standards. The certificate delivered by National Authorities should be more and more recognized from one Nation to the other.

8.2 European Regulations

Recommendation(s)
<p>Regulation (or set of regulations) : Identification and scope</p> <p>COUNCIL DIRECTIVE 93/15/EEC of 5 April 1993 on the harmonization of the provisions relating to the placing on the market and supervision of explosives for civil uses</p> <p>Scope:</p> <p>Directive 93/15/EEC applies to explosive materials and articles which are considered to be such in the United Nations Recommendations on the transport of dangerous goods and which fall within Class 1 of those recommendations. This Directive concerns the placing on the market and supervision of explosives for civilian use and it does not apply to explosives, including ammunition, intended for military or police use and pyrotechnic articles. Explosives which fall within the scope of this Directive may be placed on the market only if they:</p> <ul style="list-style-type: none">comply with all provisions of the Directive;have been assessed regarding their conformity with the essential safety requirements;have the "CE" marking affixed to them. <p>Any explosive must be designed, manufactured and supplied in such a way as to present a minimal risk to the safety of human life and health, and to prevent damage to property and the environment.</p> <p>Source: http://eur-lex.europa.eu</p>

Recommendation(s)
<p>Regulation (or set of regulations) : Identification and scope</p> <p>COMMISSION DIRECTIVE 2008/43/EC of 4 April 2008 setting up, pursuant to Council Directive 93/15/EEC, a system for the identification and traceability of explosives for civil uses</p> <p>Scope:</p> <p>This Directive establishes a harmonised system for the unique identification and traceability of explosives intended for civilian use. Member States must ensure that companies which manufacture or import explosives, and those which assemble detonators mark these products with a unique identification. As a minimum, each product must have an alphanumerical code that identifies the country and production site, in addition to a corresponding bar code or matrix code. Companies must also keep a record of all unique identification numbers and the location where each explosive is stored until it is transferred or used.</p> <p>Source: http://eur-lex.europa.eu</p>

Recommendation(s)
<p>Regulation (or set of regulations) : Identification and scope</p> <p>COMMISSION DIRECTIVE 2004/57/EC of 23 April 2004 on the identification of pyrotechnic articles and certain ammunition for the purposes of Council Directive 93/15/EEC on the harmonisation of the provisions relating to the placing on the market and supervision of explosives for civil uses</p> <p>Scope: Definition of Pyrotechnic Articles and other items which need to be CE-marked according to the requirements of European Union Council Directive 93/15/EEC Directive about the identification of pyrotechnic articles or certain ammunition and explosives for civil uses which must conform to essential safety characteristics.</p> <p>Field of application;</p> <ul style="list-style-type: none"> • Class I explosives listed in the UN Orange Book (8th Edition) • Not - pyrotechnical articles • Not - explosives or ammunition intended for use by the armed forces or police • Not - ammunition (except transfer requirements) <p>Pyrotechnic articles are expressly excluded from the scope of Directive 93/15/EEC. However, certain products have a dual function, since it is possible to use them either as explosives or as pyrotechnic articles. In order to ensure that Directive 93/15/EEC is applied consistently, the Directive classifies the products in question by their predominant nature.</p> <p>Annex I of Directive 2004/57/EC lists items considered to be pyrotechnic or ammunition, whereas Annex II lists items where expert judgement will be used by explosives notified bodies to determine if the items are within or outside the scope of Directive 93/15/EEC. Both Annexes identify the items concerned by means of their United Nations (UN) number(1) .</p> <p>Associated documents; Council Directive 93/15/EEC on the harmonisation of the provisions relating to the placing on the market and supervision of explosives for civil uses. United Nations Recommendations on the Transport of Dangerous Goods, Model Regulations, Twelfth Revised Edition, United Nations, New York and Geneva, 2001, ISBN 92-1-139074-5.</p> <p>Source: http://eur-lex.europa.eu</p> <p>This document is relevant for placing products on the market</p>

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>Directive 96/82/CE SEVESO2</p> <p>Scope: An European directive which imposes on the Member states of the European Union to</p>

identify the industrial sites presenting major risks of accidents.

Source: <http://www.legifrance.gouv.fr/>

Why chosen as best practice?

This document gives european rules.
No other international standard seems to exist.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

No specific items recognized.

Recommendation(s)

Regulation (or set of regulations) : Identification and scope

DIRECTIVE 2003/105/EC of the European Parliament and of the Council of 16 December 2003 amending Council Directive 96/82/EC on the control of major-accident hazards involving dangerous substances

Convention on the transboundary effects of industrial accidents (done at Helsinki, on 17 March 1992) ECE UN, E/ECE 1268, Ed.: UN 1992 oraz UN, New York and Geneva, 1994

Scope:

Scope: These EU addressed to the Member States are mandatory documents which constitute the core of the so called SEVESO II directive.

Directive 96/82/EC(4) aims at the prevention of major accidents which involve dangerous substances and the limitation of their consequences for man and the environment, with a view to ensuring high levels of protection throughout the Community in a consistent and effective manner. The Seveso II Directive has fully replaced its predecessor, the original Seveso Directive. Important changes have been made and new concepts have been introduced into the Seveso II Directive. This includes a revision and extension of the scope, the introduction of new requirements relating to safety management systems, emergency planning and land-use planning and a reinforcement of the provisions on inspections to be carried out by Member States.

Through the application of these documents the member state have to describe what is their safety management systems, emergency planning and land-use planning and a reinforcement of the provisions on inspections to be carried out by Member States.

In the light of recent industrial accidents (Toulouse, Baia Mare and Enschede) and studies on carcinogens and substances dangerous for the environment, the Seveso II Directive 96/82/EC was extended by the Directive 2003/105/EC of the European Parliament and of the Council of 16 December 2003 amending Council Directive 96/82/EC. The most important extensions of the scope of that Directive are to cover risks arising from storage and processing activities

in mining, from pyrotechnic and explosive substances and from the storage of ammonium nitrate and ammonium nitrate based fertilizers.

Associated documents;

-In each EU member country specific laws and applicative documents has been written to implement the EU rules.

The Directive will have to be amended due to changes to the EU system of classification of dangerous substances to which the Directive refers. The CLP Regulation (EC No. 1272/2008 on classification, labelling and packaging of substances and mixtures (GHS), published on 31 December 2008, will repeal directives 67/548/EEC (DSD) and 1999/45/EC (DPD) by 1 June 2015. In 2008, a Technical Working Group "Seveso and GHS3 was established. Experts from Member States and stakeholders are assessing the translation of the Seveso categories in annex I Part 2 of the Directive to the new classification system. A draft interim report, status May 2009, is available here. A Technical report will be available in 2010.

Source: <http://eur-lex.europa.eu>

Recommendation(s)

Regulation (or set of regulations) : Identification and scope

REGULATION (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC

Scope:

REACH is a new European Community Regulation on chemicals and their safe use (EC 1907/2006). It deals with the **Registration, Evaluation, Authorisation and Restriction of Chemical** substances. The new law entered into force on 1 June 2007.

The aim of REACH is to improve the protection of human health and the environment through the better and earlier identification of the intrinsic properties of chemical substances. At the same time, innovative capability and competitiveness of the EU chemicals industry should be enhanced. The benefits of the REACH system will come gradually, as more and more substances are phased into REACH.

The REACH Regulation gives greater responsibility to industry to manage the risks from chemicals and to provide safety information on the substances. Manufacturers and importers will be required to gather information on the properties of their chemical substances, which will allow their safe handling, and to register the information in a central database run by the European Chemicals Agency (ECHA) in Helsinki. The Agency will act as the central point in the REACH system: it will manage the databases necessary to operate the system, co-ordinate the in-depth evaluation of suspicious chemicals and run a public database in which consumers and professionals can find hazard information.

The Regulation also calls for the progressive substitution of the most dangerous chemicals when suitable alternatives have been identified.

One of the main reasons for developing and adopting the REACH Regulation was that a large number of substances have been manufactured and placed on the market in Europe for many

years, sometimes in very high amounts, and yet there is insufficient information on the hazards that they pose to human health and the environment. There is a need to fill these information gaps to ensure that industry is able to assess hazards and risks of the substances, and to identify and implement the risk management measures to protect humans and the environment.

Source: <http://eur-lex.europa.eu>

Recommendation(s)

Regulation (or set of regulations) : Identification and scope

COUNCIL DIRECTIVE 96/61/EC of 24 September 1996 concerning integrated pollution prevention and control Regulation (EC) No 1882/2003 of the European Parliament and of the Council of 29 September 2003 adapting to Council Decision 1999/468/EC the provisions relating to committees which assist the Commission in the exercise of its implementing powers laid down in instruments subject to the procedure referred to in Article 251 of the EC Treaty

Scope:

The objective of an integrated approach to pollution control is to prevent emissions into air, water or soil wherever this is practicable, taking into account waste management, and, where it is not, to minimize them in order to achieve a high level of protection for the environment as a whole. This Directive establishes a general framework for integrated pollution prevention and control; whereas it lays down the measures necessary to implement integrated pollution prevention and control in order to achieve a high level of protection for the environment as a whole; whereas application of the principle of sustainable development will be promoted by an integrated approach to pollution control.

Source: <http://eur-lex.europa.eu>

Recommendation(s)

Regulation (or set of regulations) : Identification, scope and information on the source

Regulation about the incineration of hazardous waste, European council Directive 94/67/EC of 16 December 1994, version modified on 20 November, 2003

Scope: The present directive applies to hazardous waste and protection of health and safety of the staff of installations of incineration.

It has for object to plan measures and methods allowing to prevent or reduce the negative effects of the incineration of hazardous waste on the environment and in particular pollution of air, ground, water, as well as the risks which result from it, for the health of the persons. It fixes and maintains conditions of exploitation and limit values of emission suited for the installations of incineration of hazardous waste.

This document defines the level receivable for effluent releases in case of incineration of hazardous waste. It could be applied to demilitarisation and disposal of ammunitions.

In article 6, the specificity of pyrotechnic product is not taken into account. It will be necessary to

verify that the defined method is compatible energetic products

Source: <http://eur-lex.europa.eu>

Recommendation(s)

Regulation (or set of regulations) : Identification, scope and information on the source

Regulation about the incineration of waste, Directive of european parliament and council 2000/76/EC of 4 December 2000, version modified on 11 December, 2008

Scope: The present directive applies to waste and protection of health and safety of the staff of installations of incineration.

It has for object to plan measures and methods allowing to prevent or reduce the negative effects of the incineration or co-incineration of waste on the environment and in particular pollution of air, ground, water, as well as the risks which result from it for the health of the persons. It fixes and maintains conditions of exploitation and limit values of emission suited for the installations of incineration of hazardous waste.

This document defines the level receivable for effluents releases in case of incineration of waste. It could be applied to demilitarisation and disposal of ammunitions.

Source: <http://eur-lex.europa.eu/>

Recommendation(s)

Regulation (or set of regulations) : Identification, scope and information on the source

Regulation about waste, European council Directive 75/442/CEE of 15 July 1975, version modified on 20 November, 2003

Scope: This document defines the rules to harmonize the european regulations concerning elimination waste. Measures must be plan to prevent or reduce production waste, their toxicity. Disposal must be without danger for human health or environment. Waste recovery must be promote.

It's a guide to harmonize the several regulations

Source: [http://eur-lex.europa.eu /](http://eur-lex.europa.eu/)

8.3 Consideration of national regulations

These national regulations are not in English language

Recommendation(s)

Standard (or the set of standards): Identification, scope and information on the source

Regulation concerning the limitation of the noises emitted in the environment by the

installations classified for environmental protection, French Order of January 23rd, 1997

Scope: This document fixes regulatory measures relative to the sound emissions of the installations classified for the environmental protection subjected to authorization.

These measures are applicable to the new installations, authorized after July 1st, 1997, as well as for the existing installations being the object of a modification authorized after the same date.

This document defines the method of applicable measure

No other international or European standard seems to exist.

Source: <http://www.legifrance.gouv.fr/>

Why chosen as best practice?

The level sound receivable could be applied in case of demilitarisation or disposal of ammunitions. It could be, also, applied to open detonation destruction operations

No other international standard seems to exist.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

A European agreement.

Recommendation(s)

Standard (or the set of standards): Identification, scope and information on the source

Regulation about conditions to product, sale, import, export powders and explosives substances, French decree 71-753 of 10 September, 1971, repealed on 26 November 2009 (a new version has to come in 2012)

Scope: This document defines the conditions to product, sale, import, export powders and explosives substances.

Source: <http://www.legifrance.gouv.fr/>

Why chosen as best practice?

This document gives rules for explosives substances.

No other international or European standard seems to exist.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

This document should be update and receive a European agreement.

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>Regulation about classified installations for environment protection, French law 71-663 of 19 July 1976</p> <p>Scope: This document defines the conditions for classified installations for environment protection It concerns the title V of the French environment code section 1310, 1311,1312, 1313.</p> <p>Source: http://www.legifrance.gouv.fr/</p>
<p>Why chosen as best practice?</p> <p>This document gives practical rules for classified installations. No other international or European standard seems to exist.</p>
<p>How to use it (them)</p> <p>The guidance provided in the document has to be applied for French installation and could be applied to any others.</p>
<p>What is missing?</p> <p>Such a document should be updated, discussed between nationals for receiving a European agreement.</p>

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>Regulation about safety at work for explosive workers French 79846 Decree 1979/09/28</p> <p>Scope: The aim of this text and associated applicative documents are to provide the foundation and the frame of the safety for any activity involving energetic materials with few exceptions (operational military situations, quarries, mines). The main requirements are:</p> <ul style="list-style-type: none"> - a safety study at work is mandatory and all the topics which have to be detailed are described The aim is to detect all accident possibilities, to determine their gravity, to fix the individual and collective actions in order to have the residual risk acceptable. This document has to be approved by the National authority. - rules are fixed to calculate the hazard zones, and according to annual accident likelihood the different operations are authorised or not. Protective means and constraints are described, qualification and information of personal are mandatory. <p>Associated documents;</p> <ul style="list-style-type: none"> - arrêté of April 2007 and September 2008 <p>Source: http://www.legifrance.gouv.fr/</p>
<p>Why chosen as best practice?</p> <p>This document and its associated texts is a part of the French law but it is based upon technical</p>

bases and best practices in all explosive applications. It offers rules and formulae in order to calculate hazard zones, level of acceptable risks, means to define effective protections versus the residual risks.
No international standard exists.

How to use it (them)

The guidance provided in the document has to be applied for French installation and could be applied to any others.

What is missing?

A european agreement

The way to evaluate the resistance of the building to accidental explosion. Such a document should be updated, discussed between nationals for receiving a European agreement.

Recommendation(s)

Standard (or the set of standards): Identification, scope and information on the source

2618/DEF/EMA/OL/4 instruction for munition disposal

Scope: Instruction relating to the procedures attached to the demilitarisation or to the disposal of the munitions by the external firms at the Ministries of Defence installed on the French territory. The aim of this instruction is to provide the general frame of the contracts between companies and the French MoD in particularly it defines;

- terms and definition
- the responsibilities of the partners during each phases
- the controls of the work
- the characteristics of the company

Source: <http://www.boc.sga.defense.gouv.fr>

Why chosen as best practice?

This document offers a frame which describe the contractual and relationship between the actors of disposal or demilitarisation operation.
No international standard exists.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

A European agreement

Recommendation(s)

Standard (or the set of standards): Identification, scope and information on the source

2005-1325 Decree relating to the safety rules applicable for works achieved in the frame of a pyrotechnic workshop for disposing on 26/10/2005

Scope: The aim of this instruction is to list all the specific mandatory tasks and justification which are require in order to deal with disposal activities for the French government; in particularly it defines

- the safety studies which have to be approved
- the responsibilities of the partners during each phases
- the general and workstation safety data sheets to be implemented and applied

Source: <http://www.legifrance.gouv.fr/>

Why chosen as best practice?

This document identified a best practice in order to manage disposal operation with a high level of safety. It's a guide to harmonize actions.
No international standard exists.

How to use it (them)

The guidance provided in the document has to be applied.

What is missing?

Such a document should be updated, discussed between nationals for receiving a European agreement

Recommendation(s)

Standard (or the set of standards): Identification, scope and information on the source

Requirements about the qualification of workers for disposal operation French DEFD0600022A instruction on 23 /01/2006

Scope: Level of knowledge and medical capabilities necessary for the persons in charge of safety pyrotechnics activities, person in charge of the pyrotechnic workshop and for the persons asked to make operations of pyrotechnic disposal.

Source: <http://www.legifrance.gouv.fr/>

Why chosen as best practice?

The knowledge and the background of the operators during a disposal work is a major factor of the safety; there is no other standard which describe the minimum level of training of the workers.

How to use it (them)

The general guidance provided in the document has to be applied.

What is missing?

More detailed training program. Such a document should be updated, discussed between nationals for receiving a European agreement.

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Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>Safety hazard distances of workshops for disposal French DEFD0600021A instruction on 23 January 2006</p> <p>Scope: Rules fixing the determination of the safety distances relative to the pyrotechnic workshops of disposal. This instruction provides rules in order to</p> <ul style="list-style-type: none"> - Estimate the hazards zones - Define the probability of accident - the classification of all the workshops and buildings in the surrounding area - The acceptable positions of the building according to their position in the safety areas. <p>Source: http://www.legifrance.gouv.fr/</p>
<p>Why chosen as best practice?</p> <p>A good summary of the different practices which have been proven by experiences</p>
<p>How to use it (them)</p> <p>The guidance provided in the document has to be applied.</p>
<p>What is missing?</p> <p>A European agreement on practices in the field.</p>

9- Other Relevant Documents

Recommendation(s)
<p>Standard (or the set of standards): Identification, scope and information on the source</p> <p>TM 5 1300 Structure to resist the effects of accidental explosion Nov 1990</p> <p>Scope: - The purpose of this technical manual is to present methods for designing protective construction used in facilities for all explosives activities</p> <p>Source: USA</p>
<p>Why chosen as best practice?</p> <p>This document gives practice rules for designing protective structures. No other synthetic document exists in the field.</p>
<p>How to use it (them)</p> <p>The guidance provided in the document has to be applied.</p>
<p>What is missing?</p>

Such a document should be updated, discussed between nationals for receiving a European agreement

Recommendation(s)
<p><i>Standard (or the set of standards): Identification, scope and information on the source</i></p> <p>MSIAC L-118 Review of demilitarisation and disposal techniques for munitions and related materials – January 2006</p> <p>Scope: This document provides an overview of the environmental impact and regulation of demilitarisation activities, the transport regulation, the several demilitarisation and disposal techniques. Demilitarisation of chemical and nuclear weapons are not covered.</p> <p>Source: http://www.msiac.nato.int/</p>
<p><i>Why chosen as best practice?</i></p> <p>A good summary of the different practice in the world</p>
<p><i>How to use it (them)</i></p> <p>The guidance provided in the document has to be applied.</p>
<p><i>What is missing?</i></p> <p>No specific items recognized. This document should be implemented with the return of experience in the different methods which are presented.</p>

10- Need for future standardization

In order to coordinate the highest possible level (European/international), it is necessary to create as soon as possible a standard which shall include the experiences from existing standards and regulations under a common denominator. EG 19 recognized the need for a minimum safety standard/baseline. EG 19 recommends to create a CEN workshop agreement on qualification on disposal of munitions.

11- Conclusions

Nowadays, few standards directly applicable in the field of disposal of munitions, have been identified. This lack of standard is becoming more and more stringent due to the fact that;

- in all the Nations, more and more munitions are aged and retired for service out of their life time,
- demilitarisation is a field of activity which presents a high risk of hazards for people and their surroundings,
- environmental friendliness is becoming increasingly important.

In order to ensure a common understanding, to enhance energetic materials and ammunitions disposal, and to make best use of limited resources, it is highly recommended to agree on a minimum set of rules and methodology for demilitarisation.

The existing standards which are not dedicated to dispose munition as transportation recommendations, should be implemented for disposal purpose. In their application they should be harmonised and discussed to reach an European understanding in order to get a common recognition of the National certificates and to avoid a duplication of evaluation.

In the field of safety people for pyrotechnic works, which has to fulfill different National regulations, a common standard could be discussed in order to carry out the evaluation of the risks, hazards distances, minimum protections, conformity to the installation and the surrounding.

As disposal required a case by case analysis for each munition, it could be suggested to create a standard for evaluating the level of capabilities for the disposal facilities which could lead to a quality certification. For a facility, such a certification could guarantee the level of all the processes which are critical fields for disposal:

- safety of staff,
- safety of the surrounding,
- environmental concerns,
- transport of munition and waste,
- traceability of equipment and materials,
- security of material,

Therefore, European standardisation agencies should go further in terms of implementation of best practice standards, especially in the above mentioned domain.

12- Annex

ANNEX A Excel sheet of standards

ANNEX B1 Excel sheet of International and European regulations

ANNEX B2 Excel sheet of national regulations