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Safety & occupational health - Protection of the environment

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Foreword

International standards for humanitarian demining programmes were first proposed by working groups at an international technical conference in Denmark, in July 1996. Criteria were prescribed for all aspects of demining, standards were recommended and a new universal definition of 'clearance' was agreed. In late 1996, the principles proposed in Denmark were developed by a UN-led working group and the International Standards for Humanitarian Mine Clearance Operations were developed. A first edition was issued by the UN Mine Action Service (UNMAS) in March 1997.

The scope of these original standards has since been expanded to include the other components of mine action and to reflect changes to operational procedures, practices and norms. The standards were re-developed and renamed as International Mine Action Standards (IMAS) with the first edition produced in October 2001.

The United Nations has a general responsibility for enabling and encouraging the effective management of mine action programmes, including the development and maintenance of standards. UNMAS, therefore, is the office within the United Nations responsible for the development and maintenance of IMAS. IMAS are produced with the assistance of the Geneva International Centre for Humanitarian Demining.

The work of preparing, reviewing and revising IMAS is conducted by technical committees, with the support of international, governmental and non-governmental organisations. The latest version of each standard, together with information on the work of the technical committees, can be found at <http://www.mineactionstandards.org/>. Individual IMAS are reviewed at least every three years to reflect developing mine action norms and practices and to incorporate changes to international regulations and requirements.

Introduction

Demining operations have significant potential to damage the environment in which they are conducted. This damage not only includes the short-term effects caused by demolition activities, but long-term effects that may be caused by contamination of soil and water systems, removal of vegetation, disruption to watercourses or changes to soil structure. Demining operations may also damage the natural habitats of insects and wildlife and affect areas of historical or cultural significance.

National authorities and demining organisations not only have a responsibility to ensure that demining operations are carried out in a safe, effective and efficient manner, but also in a manner that minimises any impact on the environment. The aim should be to leave the environment in a state that is similar to, or where possible better than, before demining operations commenced, and in a state that permits the intended use of the land once demining operations have been completed. The national authorities should document their environmental management policy in national mine action standards or other relevant publications in accordance with the national policies.

Safety & occupational health - Protection of the environment

1. Scope

This standard provides guidelines as to the minimum environmental protection measures that should be complied with to ensure that environments affected by demining operations are not degraded by the work and are fit for their intended use once demining is completed.

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

2. References

A list of normative references is given in Annex A. Normative references are important documents to which reference is made in this standard and which form part of the provisions of this standard.

3. Terms, definitions and abbreviations

A list of terms, definitions and abbreviations used in this standard is given in Annex B. A complete glossary of all the terms, definitions and abbreviations used in the IMAS series of standards is given in IMAS 04.10.

In the IMAS series of standards, the words 'shall', 'should' and 'may' are used to indicate the intended degree of compliance. This use is consistent with the language used in ISO standards and guidelines:

- a) 'shall' is used to indicate requirements, methods or specifications that are to be applied in order to conform to the standard.
- b) 'should' is used to indicate the preferred requirements, methods or specifications.
- c) 'may' is used to indicate a possible method or course of action.

The term 'National Mine Action Authority (NMAA)' refers to the government department(s), organisation(s) or institution(s) in each mine-affected country charged with the regulation, management and coordination of mine action. In most cases the national Mine Action Centre (MAC) or its equivalent will act as, or on behalf of, the NMAA. In certain situations and at certain times it may be necessary and appropriate for the UN, or some other recognised international body, to assume some or all of the responsibilities, and fulfil some or all of the functions, of a NMAA.

The term 'demining organisation' refers to any organisation (government, NGO or commercial entity) responsible for implementing demining projects or tasks. Demining organisations include headquarters and support elements, and comprise one or more sub-units.

The term 'protective works' refers to constructed barriers, trenches or mounds designed to reduce the effects of ground shock, noise, blast or fragmentation in order to protect personnel, property, infrastructure or the environment.

The term 'environment' refers to surroundings in which an organization operates, air, water, land, natural resources, flora, fauna, humans and their interrelation.

4. Scope of environmental impact

In accordance with the principles of ISO 14000 Environmental Management (See Annex C), environmental impact concerns:

- a) Pollution of air (noise and smoke etc), water and soil;
- b) Reduction and disposal of waste, especially toxics and hazardous waste;
- c) Reduction of energy consumption;
- d) Reduction of CO2 emissions;
- e) Use of land; and
- f) Risk to heritage.

See ISO 14000 for more details.

5. General requirements

Demining operations should be carried out without damaging property or infrastructure, in a manner that minimises the impact on the environment and is safe for local communities and demining staff.

Planning for demining operations shall take into account the effects of those operations, and any supporting activities, on the environment, and any possible damage to property or infrastructure, or harm to personnel.

Demining organisations should ensure that land, over which demining operations have taken place, is left in a state whereby it is suitable for its intended use once demining operations cease.

Particular attention should be given to property, infrastructure or land required for subsistence or economic purposes to ensure that these activities can continue after demining operations have been completed.

Note: 'Land over which demining operations have taken place' includes land used for administrative or support purposes such as temporary accommodation facilities and support areas.

6. Demining operations

6.1. Mechanical operations

The operation, repair, maintenance and servicing of machines used on demining operations shall be carried out in a manner that minimises the impact on the environment and in accordance with the requirements of the NMAA.

Where mechanical operations involve the removal of vegetation, or occur on ground that may be subject to erosion, the NMAA should specify the requirements and the measures that the demining organisations shall take to ensure the regeneration of vegetation and to limit erosion. Such measures may include:

- a) Re-seeding and re-planting (e.g. grass, trees, ground cover)
- b) Return of processed soils to the effected site (Soils that have been mechanically sifted, or gone through remediation, etc.)
- c) Planting or construction of wind barriers
- d) Preparation of drainage systems
- e) Performing the mechanical operation in a period when the soil and vegetations is less vulnerable

- f) Avoiding deep tracks by using proper equipment

Routine community liaison about mechanical operations shall include advice to property owners and local authorities about any possible damage to property or infrastructure. If necessary, advice to minimise damage should be given to property owners/controllers of land adjacent to demining worksites.

6.2. Explosive Ordnance Disposal (EOD) operations

Mines and Explosive Remnants of War (ERW) should be disposed of in a manner that minimises environmental impact and without creating damage to property or infrastructure. If mines or ERW must be destroyed in situ and there is a risk to property or infrastructure, protective works shall be used. If, even with protective works, there is still a risk of damage to property or infrastructure, the NMAA, local authorities and local communities shall be consulted about the operation.

Consideration shall be given to the possible contamination of the surrounding area (including vegetation) by fragmentation, toxic or hazardous substances and provision made to eliminate or minimise any contamination.

Note: Fragmentation contamination may affect trees used for lumber or may affect cropping activities with sharp fragments in the ground injuring animals or people engaged in these activities.

When ground shock or noise is likely to affect local communities, measures should be taken to minimise these affects. These measures may include:

- a) sitting disposal areas well away from inhabited areas;
- b) limiting the size of individual disposal serials;
- c) using pits to suppress noise;
- d) using protective works to limit the effects of ground shock and noise;
- e) restricting the conduct of disposal activities when certain meteorological conditions, for example low cloud, may increase the effects of noise.

When EOD operations cease the area used shall be refurbished in accordance with the requirements of the NMAA and in consultation with local authorities and communities. Refurbishment should include:

- a) the recovering and disposal of all large items of scrap;
- b) the filling in of any pits and craters made by bulk disposal operations; and
- c) the fencing and marking of any areas where there may be residual non-explosive hazardous material in the ground.

If required, land used for ordnance disposal operations may be formally handed over in accordance with the provisions of IMAS 08.30.

6.3. Avoiding hazardous contamination of safe areas

Demining organisations shall:

- a) prohibit the movement of mines and ERW from worksites unless this is part of a disposal or other authorised activity;
- b) provide adequate security for any mines or ERW that have to be moved from a worksite until such time as the mines or ERW have been disposed of;

- c) conduct thorough 'Free From Explosives' (FFE) and hazardous substance inspections of any packaging material moved from a worksite or any mines or ERW that are to be used for training aids; and,
- d) thoroughly check the ground within the assessed danger area surrounding mechanical clearance or disposal worksites to ensure that no mines or ERW have been 'thrown' into these areas.

6.4. Disposal of debris, rubble and wire

Debris, rubble, wire and any other remains of obstacles removed from a demining worksite shall be disposed of in accordance with the local waste management regulations and requirements of the NMAA. When applicable, local communities are to be consulted about such disposal.

Removing or taking down fences and marking stores around a cleared area and the subsequent removal for disposal are normally different activities. The responsibility for these two distinct operations should be made quite clear in any clearance contract.

When debris, rubble or wire is to be placed in a predetermined area adjacent to a worksite, the area concerned shall be confirmed as clear of mines and ERW prior to any placement occurring. All debris, rubble and wire is to be checked and confirmed as free from any hazardous components before being placed in the disposal area. The area may be required to be marked and location recorded as a hazardous waste disposal site if required by the NMAA or local authorities.

Recycling of materials, where possible, should be encouraged.

6.5. Disposal of toxic and hazardous waste

Toxic and hazardous waste are not normally found in landmines. However, if explosives contents are open to the environment, the explosives or their residues can become soil and water contaminants that may have a substantial effect upon the environment. In addition, asbestos chemicals and liquid propellants can be found in missiles and fuzing systems. Also, chemical weapons, including chlorine and mustard gas munitions, and depleted uranium projectiles may be encountered. The latter should be handled in accordance with the TNMA 09.30 02.

Other examples of toxic and hazardous waste include:

- a) Flammable substances, oily wastes, lubricants, fuel filters (FOL)
- b) Batteries
- c) Medical waste, old medicine, and other chemicals

Any toxic or hazardous waste products of demining operations shall be disposed off in accordance with the requirements of the NMAA.

Toxic waste products of demining operations shall not be buried at the work site but collected and removed to an approved disposal area.

Note: Waste batteries may be stored together and labeled in a common container as long as the container is structurally sound, prevents leaking and compatible with the batteries. Waste batteries may be accumulated for up to one year before shipping off site for recycling or disposal. In the absence of a national regulation for toxic and hazardous waste - demining organizations may ask battery suppliers whether they will take back spent batteries for recycling.

6.6. Obstruction of watercourses

Demining organisations shall not obstruct or divert the natural flow of watercourses unless it is necessary to divert or dam the watercourse to allow demining to be conducted. If it is necessary to divert or dam a watercourse, the landowner or local community is to be consulted and their agreement obtained before work commences.

6.7. Degradation of air quality

When demining organisations are conducting operations, they are to remain aware of the location of local communities, the prevailing wind conditions in the area and the ability of prevailing winds to carry smoke, dust and toxic fumes to local communities. Demining organisations shall ensure that the impact on local communities of any degradation of air quality is minimised.

When degradation of air quality is likely to effect local communities, demining organisations shall liaise with local communities and authorities to explain the scope, scale, duration of any likely air degradation and any evacuation requirements

6.8. Burning of vegetation

Burning of vegetation should be avoided, however when vegetation burning is to be carried out, where applicable, the following procedures and control measures should be applied:

- a) plans for burning vegetation should be discussed with and approved by the land owners/users and local authorities;
- b) ensure that the land owners/users and local authorities are aware of the type of mines/ERW and their likely hazards (fragments, shocks, toxic, smoke etc) in the even of burring vegetation.
- c) burning should not to be carried out at night or continue into the night;
- d) no burning should be started unless there are sufficient personnel and fire fighting equipment on site to control, and if necessary, stop the burning;
- e) wind and moisture conditions should be considered before any burning operations;
- f) all personnel involved in the burn should be briefed on the burning plan, including any safety procedures;
- g) consideration of the direction of the prevailing wind should be made when determining the direction of the burn; both as a means of controlling the burn and of minimising the effect of smoke and ash on local communities;
- h) access areas should be available around the complete perimeter of the burn area for control purposes; and
- i) burning should only to be carried out towards natural firebreaks such as roads, tracks etc. However, if this is not possible and the perimeter of an area to be burned is vegetated, the vegetation should be dampened before the burn is started and personnel should be positioned there with fire fighting equipment to control the burn.

7. Stockpile destruction operations

Stockpile destruction operations shall be planned and conducted in a manner that minimises the impact to the environment. If deemed necessary by the NMAA, this may include the conduct of an Environmental Impact Assessment (EIA)

Information on international standards, regulations, codes of practice and other advisory publications concerning environmental considerations relating to stockpile destruction operations, is included in IMAS 11.10. IMAS 11.10 covers:

- a) internationally accepted standards for the determination and measurement of air pollution from industrial processes; and
- b) guidelines for the measurement and assessment of exposure to noise in a working environment, which could be applied to open detonation stockpile destruction operations.

8. Worksites and temporary accommodation facilities

8.1. Site selection and layout

Protection of the environment shall be considered in the site selection and layout for worksites and temporary accommodation facilities.

The establishment and operation of worksites and temporary accommodation facilities shall be carried out in a manner that minimises any contamination of the land or water systems (including ground water systems) and has minimal affect on flora and the natural habitats of insects or wildlife.

Where applicable, temporary accommodation facilities shall be located in consultation with local communities to ensure that they do not adversely affect local conditions, economic activities or social and cultural values.

Temporary accommodation facilities shall comply with all national or local regulations concerning the construction of temporary facilities.

8.2. Toilets

Human waste should not be discharged into water courses or onto the soil surface.

Where possible, temporary toilets should be used on all demining worksites and temporary accommodation facilities. Temporary toilets should be equipped with holding tanks that can be pumped to sewage trucks for disposal, or connected to septic tanks and safe drainage.

Where latrines are used, there should be at least one for every 20 persons. They should be located at least 6 m from any accommodation or food preparation area and 20m from any watercourses or wells.

All Latrines shall be constructed in such a way that they do not contaminate the surrounding water supply.

Shallow trench latrines (for a few days) should be a minimum of 30 x 75cm and 1-1.5m deep. Deep latrines (for a few months) should be a minimum of 2 - 2.75m deep. When filled in there should be at least 0.5m of earth cover over the toilet pit.

8.3. Domestic rubbish

Rubbish removed from the site shall be disposed of at approved rubbish dumping sites. Any rubbish spilled during the removal process is to be cleaned up.

Rubbish shall only be buried with the approval of the local communities/authorities and then in locations agreed to by them.

Rubbish pits shall be located away from watercourses and wells, and shall be located and constructed so as not to contaminate groundwater. Pit bottoms should be at least 2m above the water table. Rubbish pits are to be deep enough to allow 1m of earth cover over the rubbish when they are filled in.

Consideration should be give that no hazardous wastes (Petroleum products, hazardous metals, etc.) be buried

8.4. Waste water

Waste water from washing, bathing or kitchen areas shall be drained into soak pits large enough to take the amount of waste water generated. Soak-away pits should be at least 75cm x 75cm and 1m deep.

Waste water is not to be released onto the ground surface or into watercourses.

8.5. Domestic water supply

The supply of domestic water is to be carried out in a manner that does not affect the supply of water to the local communities; unless the local communities have been consulted on this matter and have agreed to any arrangements made.

8.6. Fuel, Oil and Lubricant (FOL) areas

Demining organisations shall ensure that procedures are in place that ensures that any spills of FOL are able to be contained and quickly cleaned up. Contaminated materials containing spilled FOL should be collected and disposed of at controlled landfill. Alternatively, the material should be disposed of at a specific site approved by the NMAA, where the leakage to the soil is prevented

Where it is necessary to establish fuel storage facilities, precautions shall be taken to ensure that FOL is stored safely and does not contaminate the soil or groundwater. These precautions include:

- a) no fuel storage facilities are to be positioned closer than 30m to a watercourse;
- b) all storage tanks, containers and fuel dispensing equipment are to be regularly maintained to ensure that there are no leaks; and
- c) vehicle and equipment fuelling should be undertaken on a hard surface or over drip pans to ensure that any spilled FOL is contained and disposed of in an environmentally acceptable manner.

8.7. Maintenance areas

When maintenance, repair or washing of vehicles, machines and equipment is required on worksites, specific areas shall be designated for this activity. The environmental precautions to be taken include:

- a) waste water shall not to be released so that it will enter watercourses;
- b) drained oil shall be contained using a drip pan or other suitable receptacle and disposed of in an environmentally acceptable manner; and
- c) used parts, by-products of maintenance or other rubbish (except waste oils) shall be disposed of as for domestic rubbish.

8.8. On completion of demining operations

On completion of demining operations, all buildings, equipment, surplus materials, fencing (except that marking hazardous areas) and other such items shall be removed. Toilets, soak pits and rubbish pits shall be filled in, covered with soil and the surface stabilised to prevent erosion and to allow natural regeneration of vegetation.

As far as practicable, all disturbed areas should be restored to their original condition.

9. Transportation of hazardous materials

During the transportation of any hazardous, toxic or flammable materials with the potential to damage the environment, precautions shall be taken to ensure that risk is minimised. These should include:

- a) all materials to be transported in containers that will minimise or prevent spills or leakage;
- b) materials to be securely loaded in the transport;
- c) fire precautions to be taken relevant to the materials being transported;
- d) vehicles carrying hazardous material to be driven in a safe and careful manner and;
- e) vehicles meet NMAA and or host nation regulations for the transportation of these materials.

IMAS 10.50 Storage, transportation and handling of explosives provides specifications and guidelines for the safe storage, transportation and handling of explosives used by demining organisations.

In addition and where applicable, the transport of hazardous material should be in accordance with international standards. (See normative references)

10. Areas of cultural or historical significance

Demining operations may occur in locations where there are areas of cultural or historical significance. Where this occurs demining organisations should take all possible steps to prevent damage to these sites.

Such action may dictate that any mines or ERW found at the worksite are removed to another area for destruction. If these items are unsafe to move and in situ demolitions are necessary, protective works shall be used.

If any article is located during demining operations and is suspected of being of cultural or historical significance, work in that area should cease and the matter reported to the NMAA.

Where human remains are encountered during demining operations, action in accordance with International Human Law shall be followed. TNMA 10.10 10 provides additional guidance.

11. Environmental incidents

Environmental incidents shall be reported to the NMAA as soon as practicable after the incident occurred. Reports shall include the circumstances surrounding the incident, the action taken, results of the action taken and the effects of the incident on the environment.

The NMAA may conduct investigations into environmental incidents that occur during demining operations.

12. Responsibilities and obligations

12.1. NMAA's responsibilities

The NMAA, or organisation acting on its behalf, shall:

- f) Document its environmental management policy in national mine action standards or other relevant publications. Such environmental management policies shall be in accordance with national policies;
- g) monitor compliance by demining organisations with documented environmental management requirements;
- h) ensure that protection of the environment is taken into account during planning for demining operations; and
- i) maintain records of reported environmental incidents;
- j) where necessary, conduct investigations into environmental incidents;
- k) promulgate information about significant environmental incidents to other demining organisations within the programme.

12.2. Demining organisation's responsibilities

Demining organisations shall:

- a) comply with NMAA environmental management policy;
- b) document their environmental management requirements in Standard Operating Procedures (SOPs) or other relevant documents and ensure that all personnel are aware of the requirements;
- c) ensure that the protection of the environment is a factor in the planning and conduct of all demining operations;
- d) maintain records of environmental incidents;
- e) report any significant environmental incidents to the NMAA or organisation acting on its behalf.

In the absence of a NMAA or other authority, the demining organisation shall assist the host nation, during the establishment of a NMAA, in framing national standards for the protection of the environment.

Annex A (Normative) References

The following normative documents contain provisions, which, through reference in this text, constitute provisions of this part of the standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of the standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid ISO or EN:

- a) IMAS 04.10 Glossary of mine action terms, definitions and abbreviations.
- b) IMAS 08.30 Post-clearance documentation.
- c) IMAS 10.50 S&OH - Storage, transportation and handling of explosives.
- d) IMAS 11.10 Guide for the destruction of stockpiled anti-personnel mines.
- e) TNMA 10.10 Guidelines on the management of human remains located during mine action operations (Draft)
- f) TNMA 09.30.02 Clearance of depleted Uranium (DU) hazards
- g) ISO 14000 Environmental Management (See Annex C)
- h) The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)¹

The latest version/edition of these references should be used. GICHD hold copies of all references used in this standard. A register of the latest version/edition of the IMAS standards, guides and references is maintained by GICHD, and can be read on the IMAS website (<http://www.mineactionstandards.org/>). NMAA, employers and other interested bodies and organisations should obtain copies before commencing mine action programmes.

¹ The European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) was done at Geneva on 30 September 1957 under the auspices of the United Nations Economic Commission for Europe, and it entered into force on 29 January 1968. The Agreement itself was amended by the Protocol amending article 14 (3) done at New York on 21 August 1975, which entered into force on 19 April 1985.

Annex B (Informative) **Terms, definitions and abbreviations**

B.1.

Anti-Personnel Mines (APM)

a mine designed to be exploded by the presence, proximity or contact of a person and that will incapacitate, injure or kill one or more persons.

Note: Mines designed to be detonated by the presence, proximity or contact of a vehicle as opposed to a person that are equipped with anti-handling devices, are not considered APM as a result of being so equipped. [MBT]

B.2.

demining

humanitarian demining

activities which lead to the removal of mine and ERW hazards, including technical survey, mapping, clearance, marking, post-clearance documentation, community mine action liaison and the handover of cleared land. Demining may be carried out by different types of organisations, such as NGOs, commercial companies, national mine action teams or military units. Demining may be emergency-based or developmental.

Note: in IMAS standards and guides, mine and ERW clearance is considered to be just one part of the demining process.

Note: in IMAS standards and guides, demining is considered to be one component of mine action.

Note: in IMAS standards and guides, the terms demining and humanitarian demining are interchangeable.

B.3.

demining organisation

refers to any organisation (government, NGO or commercial entity) responsible for implementing demining projects or tasks. The demining organisations may be a prime contractor, subcontractor, consultant or agent.

B.4.

destroy (destruction) in situ

blow in situ.

the destruction of any item of ordnance by explosives without moving the item from where it was found, normally by placing an explosive charge alongside.

B.5.

Environmental management system (EMS)

part of an organisation's management system used to develop and implement its environmental policy and manage its environmental aspects.

Note: A management system is a set of interrelated elements used to establish policy and objectives and to achieve those objectives.

Note: A management system includes organisational structure, planning activities, responsibilities, practices, procedures, processes and resources.

B.6.

Environmental Impact Assessment (EIA)

the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of mine action activities prior to decisions being taken and commitments made.

B.7. Explosive Ordnance Disposal (EOD)

the detection, identification, evaluation, render safe, recovery and disposal of ERW. EOD may be undertaken:

- a) as a routine part of mine clearance operations, upon discovery of the ERW.
- b) to dispose of ERW discovered outside mined areas, (this may be a single ERW, or a larger number inside a specific area).
- c) to dispose of EO which has become hazardous by damage or attempted destruction.

B.8.

hazard (ous) area

contaminated area

a generic term for an area not in productive use due to the perceived or actual presence of **mines, UXO** or other **explosive** devices.

B.9. intended use (land)

use of land following demining operations.

Note: Intended use: use of a product, process or service in accordance with information provided by the supplier. [ISO Guide 51:1999(E)]

Note: Intended land use should be included in the clearance task specification and clearance task handover documentation.

B.10.

National Mine Action Authority (NMAA)

the government department(s), organisation(s) or institution(s) in each mine-affected country charged with the regulation, management and coordination of mine action.

Note: In most cases the national MAC or its equivalent will act as, or on behalf of, the 'NMAA'.

Note: In certain situations and at certain times it may be necessary and appropriate for the UN, or some other recognised international body, to assume some or all of the responsibilities, and fulfil some or all of the functions, of a NMAA.

B.11.

Mine Action Centre (MAC)

Mine Action Coordination Centre (MACC)

an organisation that carries out MRE training, conducts reconnaissance of mined areas, collection and centralisation of mine data and coordinates local (mine action) plans with the activities of external agencies, of (mine action) NGOs and of local deminers. [UN Terminology Bulletin No. 349] For national mine action programmes, the MAC/MACC usually acts as the operational office of the NMAA.

Annex C (Informative)

Introduction to ISO 14000 Environmental management

C.1

EN ISO 14000 series on Environmental Management Systems

As a number of national standards emerged (BS 7750:1994 being the first), the International Standards Organisation (ISO), developed a series of voluntary standards and guidelines in the field of environmental management which collectively are known as the EN ISO 14000 series. The EN ISO 14000 series has been adopted by the European Standardisation body (CEN), as designated by the prefix EN. This implies that EU member states are bound to implement an EN ISO 14000-compliant EMS, wherever a European Directive defines the necessity of an EMS. Developed under ISO Technical Committee 207, the 14000 series of standards address the following aspects of environmental management:

- Environmental Management System (EN ISO 14001)
- Environmental Auditing & Related Investigations
- Environmental Labels and Declarations
- Environmental Performance Evaluation
- Life Cycle Assessment
- Greenhouse gasses

C.2

Contents of the ISO 14000

EN ISO 14000 series provides a framework for the development of an environmental management system and the supporting audit program. The main thrust for its development came as a result of the Rio Summit on the Environment held in 1992 and the Earth Summit in Johannesburg 2002.

EN ISO 14001, last revised in 2004, is the corner stone standard of the EN ISO 14000 series. It specifies a framework of control for an Environmental Management System against which an organization can be certified by a third party. Other standards in the series are actually guidelines, many to help you achieve certification to EN ISO 14001. The most relevant are the following²:

ISO 14004 provides guidance on the development and implementation of environmental management systems

ISO 14010 provides general principles of environmental auditing (now replaced by EN ISO 19011)

ISO 14011 provides specific guidance on audit an environmental management system (now replaced by EN ISO 19011)

ISO 14012 provides guidance on qualification criteria for environmental auditors and lead auditors (now replaced by EN ISO 19011)

ISO 14013/5 provides audit program review and assessment material

EN ISO 14020 deals with labelling issues

ISO 14030 provides guidance on performance targets and monitoring within an Environmental Management System

EN ISO 14040 covers life cycle issues

² The complete list of standards within the EN ISO 14000 series can be found in: <http://www.iso.org/iso/en/CatalogueListPage.CatalogueList?ICS1=13&ICS2=20&ICS3=10&scopelist=>

C.3

Principles of ISO 14000

Of all these, EN ISO 14001 is not only the most well known, but is the only standard of the series against which it is currently possible to be certified by an external certification authority. While EN ISO 14001 instructs organisations to identify and manage all significant environmental impacts of their activities, products or services, it does not specify absolute requirements for environmental performance except to demand a commitment to continuous improvement. Because the standard's goal is improved environmental performance, its methodology involves developing effective management mechanisms that are integrated into the management structure of the organisation in order to achieve the objectives of a stated environmental policy.

The essential elements of an EN ISO 14000-compliant EMS are the auditable requirements. The five principle elements, stated in the ISO 14004 standard (Environmental Management Systems - Specification with Guidance for Use) are highlighted below:

- *Environmental Policy*
- *Planning*
 - Environmental aspects
 - Legal and other requirements
 - Objectives and targets
 - Environmental management program(s)
- *Implementation and Operation*
 - Structure and responsibility
 - Training, awareness, and competence
 - Communication
 - Environmental management system documentation
 - Document control
 - Operational control
 - Emergency preparedness and response
- *Checking and Corrective Action*
 - Monitoring and measurement
 - Non-conformance and corrective and preventive action
 - Records
 - Environmental management system audit
- *Management Review*

C.4

Basic principles of ISO 14000

An EMS is not a stagnant system but must continually evolve to meet an organization's ever-changing needs. Central to the EN ISO 14001 model is the idea of a continuous feedback loop.

PLAN – DO – ACT - CHECK

It starts with the development of policy, moves to planning activities and policy implementation, addresses checking and corrective actions, progresses to management review, and finally feeds information back into policy development. Although the information gathered along the way may result in the modification of organizational goals, objectives, and targets, the feedback loop always begins again, ensuring movement towards continuous environmental improvement.

Annex D (Informative) Environmental management checklist for temporary support facilities

The following check-list can be used to assist managers and operational staff as a reminder or to confirm whether environmental aspects have been addressed or not when temporary facilities are occupied or used.

D.1 Location

- Selected in consultation with local community leaders.
- Preference given to existing access roads and sites.
- Avoids agriculturally productive or environmentally sensitive areas.
- Ensures the safe: provision of drinking water, disposal of human excreta, wastewater and garbage; control of insects and rodents; conduct of food handling and preparation; and drainage of the site.
- Avoids vegetation clearing, or uses hand clearing if practical, and avoids soil disturbance or grubbing.
- Site is stable, well-drained and, if necessary, have sufficient soil depth to permit the digging of latrines, wastewater soak-away pits, and garbage pits.

D.2 Water supply

- Arranged to avoid disrupting supplies to nearby land users/owners and communities.
- Supply is safe for human consumption.

D.3 Solid waste

- All areas are kept clear of litter and garbage.
- All personnel are instructed to properly dispose of food and other wastes.
- Solid waste containers are:
 - Large enough to contain all wastes generated between collection periods.
 - Sufficient to permit the separation of combustible and other waste.
 - Animal- and insect-proof, especially for rodents.
 - Designed to contain spilled liquids.
 - Regularly serviced.
- Waste is hauled away for recycling or disposal at approved dumping sites wherever possible. Any waste materials or litter deposited along access routes is cleaned up.
- Unavoidable on-site disposal:
 - Combustible solid wastes are regularly burned and disposed of in a pit. Ashes are covered with soil after each burning/deposition.
 - Other wastes are buried in a pit and covered daily.
 - All burial pits are located well away from watercourses such that contamination of any stream, lake or groundwater system is avoided. Pit bottoms are at least 2 m above the water table.
- Toxic or hazardous wastes are collected and removed to an approved disposal site.

D.4 Human waste

- Human waste is not discharged into watercourses or on the soil surface.
- Where possible, temporary toilets are used that are equipped with (1) holding tanks that can be pumped to sewage tanker trucks for disposal at an approved site, or (2) septic tanks and safe drainage.
- Where latrines must be used:
 - There is at least one for every 20 persons.

- They are at least 6 m from any accommodation or food preparation area, and at least 15 m (preferably more) from watercourses, wells or other drinking-water sources.
- Surface water should drain away from and not into pits.
- Shallow trench latrines (for a few days) are in the order of 30 cm by 75 cm by 1-1.5 m deep.
- Deep latrines (for a few months) are in the order of 2-2.75 m deep.
- They are limed regularly.

D.5 Wastewater

- Excess water from washing, bathing and kitchen areas is drained to soak-away pits unless the quantities are quite small.
- Wastewater is not permitted to enter watercourses or latrines.
- Soak-away pits are:
 - Of sufficient number and size to readily accommodate the volumes of wastewater generated, and at least 50 cm above the water table.
 - Covered with hessian or geotextile or similar material and secured around the edges, and lined with gravel and rocks.
 - Treated regularly with disinfectant.

D.6 Demobilization

- All temporary support facilities and camp infrastructure, including buildings, equipment, lumber, refuse, surplus materials, fencing and other such items are completely removed.
- Latrines, wastewater soak-away pits, and garbage disposal pits are filled and covered with soil, and the surface stabilised to prevent erosion and allow natural re-vegetation.
- Road beds, temporary culverts, buried water lines, etc. are removed and the sites similarly stabilised. If necessary, suitable substitute material is brought in to replace removed material.
- The original drainage pattern is re-established.
- As far as is practicable and desirable, all disturbed areas are restored to their original condition.

Amendment record

Management of IMAS amendments

The IMAS series of standards are subject to formal review on a three-yearly basis, however this does not preclude amendments being made within these three-year periods for reasons of operational safety and efficiency or for editorial purposes.

As amendments are made to this IMAS they will be given a number, and the date and general details of the amendment shown in the table below. The amendment will also be shown on the cover page of the IMAS by the inclusion under the edition date of the phrase *'incorporating amendment number(s) 1 etc.'*

As the formal reviews of each IMAS are completed new editions may be issued. Amendments up to the date of the new edition will be incorporated into the new edition and the amendment record table cleared. Recording of amendments will then start again until a further review is carried out.

The most recently amended IMAS will be the versions that are posted on the IMAS website at www.mineactionstandards.org.

Number	Date	Amendment Details