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Safety & occupational health - Reporting and investigation of demining incidents

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Foreword

International standards for humanitarian mine clearance programmes were first proposed by working groups at an international technical conference in Denmark, in July 1996. Criteria were prescribed for all aspects of mine clearance, 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).

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

The need to report and investigate demining incidents in a clear, comprehensive and timely manner is an essential part of mine action management. The aim of an investigation is to identify problems or opportunities to improve the safety and quality of the demining process.

The effective management and supervision of mine action programmes will reduce the likelihood of harm, but there will always be the potential for demining incidents to occur. There are legal and moral obligations on managers at all levels in mine action to ensure that the likelihood of harm is reduced to the lowest realistic levels. Effective reporting and the thorough investigation of demining incidents can play an essential part in meeting this objective. Information collected and presented in a clear and accessible format will contribute to the 'lessons learned' process, assisting emergency response, improving the quality of the demining process and reducing the likelihood of future demining accidents.

The aim of this standard is to provide specifications and guidance on the minimum requirements for the reporting and investigation of demining incidents. The document is in three parts: clauses 1 to 3 define the scope, references and terms used in the standard; clauses 4 and 5 define the requirements, specifications and responsibilities; and the Annexes provide additional detailed information and guidance on how the standard can be applied.

Safety & occupational health - Reporting and investigation of demining incidents

1. Scope

This IMAS provides specifications and guidance to National Mine Action Authorities (NMAA) and demining organisations on the minimum requirements for the reporting and investigation of a demining incident. It includes definitions for categorisation of demining incidents, which should assist in drawing lessons that will benefit the wider demining community.

This standard is applicable only for the reporting and investigation of incidents that occur at the demining workplace. It is not applicable to incidents away from the workplace (see terms, definitions and abbreviations below). Neither does it apply to investigations carried out to satisfy national or police requirements, though the relevant authority may choose to adopt elements as appropriate.

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 which are to be adopted in order to satisfy the standard in full;
- b) 'should' is used to indicate the preferred requirements, methods or specifications; and
- c) 'may' is used to indicate a possible method or course of action.

The term 'accident' refers to an undesired event which results in harm.

The term 'incident' refers to an event that gives rise to an accident or has the potential to lead to an accident.

The term 'demining incident' refers to an incident at a demining workplace involving a mine or UXO hazard (c.f. mine incident).

The term 'mine incident' refers to an incident away from the demining workplace involving a mine or UXO hazard (c.f. demining incident).

4. Incident reporting and investigation requirements

4.1. Incidents

4.1.1. General requirements

The following incidents shall be reported to the NMAA:

- a) an accident in which a mine, UXO or explosives harms a demining employee, visitor or member of the local population at a demining workplace;
- b) an incident in which a mine, UXO or explosives damages equipment or property at a demining workplace;
- c) the discovery of a mine or UXO located in an area previously cleared, recorded as cleared or marked as cleared, regardless of whether harm has resulted from the mine or UXO;
- d) where demining workers, visitors or the local population are exposed to intolerable risk that results from the application of documented standards or Standard Operating Procedures (SOPs), including the failure of equipment issued to employees;
- e) any unplanned detonation of a mine, UXO or explosives on a demining worksite irrespective of the cause or outcome; and
- f) a non mine, UXO or explosive related accident on a demining worksite that requires the urgent evacuation of a casualty to an advanced medical facility for treatment. These accidents may indicate a deficiency in procedures or equipment.

Authorities receiving reports of incidents that highlight inadequacies of equipment, standards or approved SOPs, or that indicate the presence of new types of hazard, shall disseminate a general warning to all demining organisations applying the same equipment, standard or SOP, or likely to meet the same new hazards. In the absence of a NMAA the demining organisations themselves shall assume this responsibility.

Note: A NMAA may also feel it necessary to fully investigate the circumstances surrounding a mine incident in terms of evaluating the risk taking behaviour of a community. This will then enable them to better evaluate the value or relevance of a specific MRE message or programme.

4.1.2. Incident reporting

Demining incident reports shall follow two formats. A demining incident initial report and a demining incident detailed report.

4.1.2.1. Demining incident initial report

The demining incident initial report comprises two parts; an immediate report by the fastest means, normally radio or telephone and the full demining incident initial report in writing by facsimile or email. The demining incident initial report provides essential information about the incident to permit the NMAA to assist with any emergency response and if necessary to provide a general warning to other demining organisations in relation to an unforeseen hazard or the application of standards, SOPs or equipment.

4.1.2.2. Demining incident detailed report

The demining incident detailed report is the result of an internal investigation carried out by the demining organisation involved. The report shall be completed by an internal Investigation Officer (IO), but this shall not be any person directly involved with the incident. This report shall be initiated by the demining organisation involved and completed as soon as practically possible after the incident (normally within 10 days). In the case of a non demining incident the requirement for a demining incident detailed report will be decided on a case by case basis by the NMAA. For some incidents of a minor nature the demining incident detailed report may constitute the formal incident investigation. See Appendix 1 to Annex D.

4.1.3. Reporting procedures

An example of demining incident reporting procedures is included in Annex C. This includes example formats for the demining incident initial report (Appendix 1 to Annex C) and the demining incident detailed report (Appendix 2 to Annex C).

4.2. Formal investigations

4.2.1. General requirements

The aim of the demining incident formal investigation is to identify problems or opportunities to improve the safety and quality of the demining process. It is neither a criminal investigation nor an investigation to assist in the assessment of a current or possible future insurance claim. As such, all employees of demining organisations should be encouraged to provide complete and accurate information about the circumstances surrounding the incident and opinions on ways to improve procedures that may assist in preventing a similar incident occurring.

The following incidents should be subject to formal investigation by an appropriately qualified and experienced third party:

- a) a demining accident resulting in injury or death;
- b) a demining incident resulting in damage to property;
- c) a demining incident causing damage that may result in a major claim for compensation from a member of the public;
- d) a demining incident involving a major event causing significant damage;
- e) a demining incident involving the discovery of a mine or UXO in an area previously cleared, recorded as cleared or marked as cleared;
- f) a demining incident where demining workers, visitors or the local population are exposed to intolerable risk that results from the application of approved standards or procedures including the failure of equipment;
- g) a demining incident involving the unplanned detonation of a mine, UXO or explosives on a demining worksite;
- h) a demining incident which could attract media attention or media report;
- i) when considered necessary by the NMAA a non mine, UXO or explosive related accident on a demining worksite that requires the urgent evacuation of a casualty to an advanced medical facility for treatment.

Note: Mine incidents may also be subject to formal investigation in order to obtain operational information for the purposes of behaviour change analysis, or as a random sampling investigation of civilian accidents. Such investigations would most likely be directed at a national level and will be required to be carried out by an appropriately qualified and experienced third party.

4.2.2. Investigation procedures

A demining incident formal investigation may consist of one of three levels of investigation, a Board of Inquiry (BOI), an independent investigation and an internal investigation. Appendix 1 to Annex D has a guide for selecting an appropriate level for a formal investigation.

BOI and independent investigations are initiated by the NMAA by the issuing of Terms of Reference (TOR) appointing personnel to carry out an investigation. Appendix 2 to Annex D has an example of TOR for a BOI or independent investigation.

Internal investigations are only carried out for demining incidents of a minor nature and normally the demining incident detailed report will constitute this investigation. Demining incident detailed reports shall be initiated by demining organisations for all reportable incidents (see clause 4.1.1 above) without reference to the NMAA. Where a BOI or an independent investigation is required a demining incident detailed report should precede the formal investigation and form part of the formal investigation report.

If circumstances warrant it the NMAA may issue TOR to a demining organisation for an internal investigation. If this occurs this internal investigation will replace the demining incident detailed report.

The authority initiating a formal investigation should ensure that:

- a) the investigation commences as soon as possible;
- b) the personnel selected to conduct a formal investigation had no involvement with the incident and have the qualifications, experience and skills needed to meet the requirements specified in the TOR for the investigation;
- c) a copy of the TOR is provided to the demining organisation(s) that may be asked to assist with the formal investigation and the development of recommendations on improvements to the demining process under investigation;
- d) the incident site is preserved as far as possible, until released by the BOI or investigating officer, in order to prevent loss of valuable information;
- e) photographs of the incident site are taken immediately; and
- f) unless exceptional circumstances exist, the investigation report is submitted on time and that it is complete, clear, concise and accurate (including conclusions and recommendations for improvement).

Note: BOIs should comprise a minimum of three appropriately qualified and experienced members of the senior or technical management within a mine action programme. The principal member should be from the NMAA/MAC, one member from a third party demining organisation (for example from the MAC or a training or monitoring organisation etc.) and one member from the organisation involved with the incident, but this shall not be any person directly involved in the incident.

Note: The independent investigation shall be carried out by an appropriately qualified and experienced independent Investigation Officer (IO) appointed by the NMAA/MAC.

Note: The internal investigation shall be carried out by an appropriate qualified and experienced member of the demining organisation involved, but this shall not be any person directly involved in the incident.

An example of a demining incident investigation SOP is included in Annex D.

4.3. Reporting and dissemination

The following information should be widely distributed:

- a) the circumstances contributing to and harm resulting from the incident;
- b) an analysis of the information collected during the investigation; and
- c) the findings of the investigation (i.e. the conclusions and recommendations drawn from the investigation process).

The NMAA, or an organisation acting on its behalf, shall disseminate information on demining incidents. In the absence of a NMAA, demining organisations should make this information available to other demining organisations operating in the country, and to other NMAA through UNMAS. In the event of the identification of new hazards, the dissemination of information should be immediate.

5. Responsibilities

5.1. National responsibilities

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

- a) establish and maintain procedures for the reporting and investigation of demining incidents. The procedures should be based on this standard and other relevant standards and national regulations;
- b) appoint personnel to investigate demining incidents in accordance with this standard;
- c) disseminate the findings of all investigation reports to all demining organisations operating in the country, and importantly to UNMAS, who can then extract information for other NMAA; and
- d) ensure that the results of any medical examination, post mortem or coroner's report are made available to the parent demining organisation.

Note: It is highly probable that this information will only be made available for public release after the completion of the formal investigation. Should the medical results cast any doubt on the findings of the formal investigation, then the NMAA shall re-open the investigation to take into account this new evidence.

5.2. Employers' responsibilities

Demining employers shall:

- a) report all reportable demining incidents to the NMAA in a timely manner;
- b) take immediate photographs of a demining incident site, and then preserve it until the site is inspected and released by the BOI or investigating officer;
- c) provide access, and if necessary administrative support to incident investigation personnel;
- d) make available for the investigation the original worksite records, SOPs, training records and radio log;
- e) assist staff appointed to investigate demining incidents; and
- f) in the absence of a NMAA, make the findings of investigations available to other demining organisations operating in the country and to other NMAA through UNMAS.

5.3. Employees' obligations

Demining workers shall:

- a) apply appropriate standards and SOPs designed to prevent demining incidents;
- b) report perceived weaknesses in equipment training and procedures;
- c) report reportable incidents; and

- d) assist in the investigation of incidents.

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 09.30 Explosive ordnance disposal;
- b) IMAS 10.10 S&OH - General requirements; and
- c) IMAS 10.20 S&OH - Demining worksite safety.

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: (See www.mineactionstandards.org). NMAA, employers and other interested bodies and organisations should obtain copies before commencing mine action programmes.

Annex B (Informative) Terms, definitions and abbreviations

**B.1.
accident**

an undesired event which results in harm.

Note: Modified from definition in OHSAS 18001:1999.

**B.2.
deminer**

a person qualified and employed to undertake demining activities on a demining worksite.

**B.3.
demining accident**

an accident at a demining workplace involving a mine or UXO hazard (c.f. mine accident).

**B.4.
demining incident**

an incident at a demining workplace involving a mine or UXO hazard (c.f. mine incident).

**B.5.
demining worker**

all employees who work at a demining worksite.

**B.6.
demining worksite**

any workplace where demining activities are undertaken.

Note: Demining worksites include workplaces where survey, clearance and EOD activities are undertaken including centralised disposal sites used for the destruction of mines and UXO identified and removed during clearance operations.

Note: Survey, in relation to a demining worksite includes general survey undertaken to identify mine and UXO hazards and hazardous areas.

**B.7.
incident**

an event that gives rise to an accident or has the potential to lead to an accident.

**B.8.
mine accident**

an accident away from the demining workplace involving a mine or UXO hazard (c.f. demining accident).

**B.9.
mine incident**

an incident away from the demining workplace involving a mine or UXO hazard (c.f. demining incident).

**B.10.
workplace**

all places where employees need to be or to go by reason of their work and which are under the direct or indirect control of the employer. [ILO R164]

Annex C (Informative) Example of demining incident reporting procedures

Title: Demining incident reporting procedures.	No: IMAS 10.60	Date: 01/10/04	
Intent: Efficient and accurate reporting of demining incidents providing information required to assist in emergency response and initiation of investigation procedures.	Process user: Operations manager.		
	Process owner: Director operations.		
Process description	Responsibility		
	Worksite Manager	Demining Org	NMAA/ MAC Other Authority
Demining incident Implement demining organisation's emergency response SOP and incident-site preservation SOP.	○ ↓		
Collect data and prepare incident initial report See Appendix 1 to this Annex for an example of the information to be included in the incident initial report.	□ ↓		
Submit incident initial report (two parts) Submit initial notification with key information by radio or telephone, follow up with written report by facsimile or email.	□ → □ → □	□ → □	(See note 1) □
Does incident identify an intolerable risk a. such as an unforeseen hazard (new device or technique used in minelaying or boobytrapping)? or b. in documented standards or approved SOPs including the failure of equipment issued to employees?			◇ y no
Send general warning message. See note 2 below General warning message shall advise caution in relation to the unforeseen hazard (new device or technique used in minelaying or boobytrapping) or the application of the standards, SOPs or equipment.		□ → □	
Is an external formal investigation required? See Appendix 1 to Annex D for a guide on the decision making process. See note 3 below.		○ → ◇ no	
Submit incident detailed report Compile and submit incident detailed report. See Appendix 2 of this Annex for an example of a demining incident detailed report.		□ → ○	yes
Appoint a board of inquiry (BOI) or external investigation officer See Appendix 2 to Annex D for example terms of reference for a formal investigation.			□
Investigate incident Demining organisation shall assist with the formal investigation.			□
<p>Note: 1 Submit to police or other national authority as required or as appropriate.</p> <p>Note: 2 To all demining organisations applying the same equipment, standards or SOPs or likely to meet the same new hazard.</p> <p>Note: 3 If the NMAA/MAC decides that an internal formal investigation is all that is required then the incident detailed report should constitute this investigation.</p>	<p>Legend</p> <p>Documents □ (multiple) □</p> <p>Process □ Decision ◇</p> <p>Multiple responsibility ■ Connector ○</p>		

Appendix 1 to Annex C (Informative) Example of demining incident initial report

From:	Demining organisation name. See note 1 Date & time report submitted. See note 2
To:	NMAA/MAC, programme name.
Subject:	Demining Incident Initial Report
1.	Organisation sub unit, site office/project number, team name/number.
2.	Location (province, district, village, task no).
3.	Date and time of incident.
4.	Details of casualty(ies) to include:
a)	Names or casualty identification numbers (CIN). See notes 3 and 4
b)	Description of injuries. See note 5
c)	Treatment given.
d)	Current condition of casualty(ies).
5.	Evacuation methods, routes, destinations and estimated arrival times.
6.	List equipment/facilities/infrastructure damaged. See note 6
7.	Describe how the incident occurred. See note 7
8.	Contact details of key personnel. See note 8
9.	Any other information including: See note 9
a)	Did the incident occur in a cleared, safe or contaminated area?
b)	Device type (if known).
10.	Any other relevant information. See notes 9 and 10

Note: 1 The highlighted information should be sent by radio or telephone immediately it is known. The full demining incident initial report (including all information) is then sent by facsimile or email as soon as practically possible. (**See note 10 below**). This should be followed up by a radio or telephone message advising that the report has been sent. Timings for the submission of reports should be set by the NMAA and included in national mine action standards.

Note: 2 Date and time the reports (initial report and full demining incident report) are sent.

Note: 3 A CIN is a number allocated to each demining worker on a worksite. The CIN is used when it is not appropriate to send casualty names by radio.

Note: 4 For demining workers, include name (or CIN) and appointment (i.e. deminer, team leader, surveyor etc). For non demining workers include contact details of the injured party or a person who can be the point of contact. Contact details for non demining workers do not need to be sent with the initial report but the detail that a non demining worker was injured, does.

Note: 5 List injuries for each casualty separately referenced to the name or CIN.

- Note: 6 List the equipment, facilities or infrastructure damaged, including a short description of the extent of the damage, and where appropriate the name and contact details of owners.
- Note: 7 Include a short description of how the incident occurred. In the case of a mine/UXO located in a cleared area, a failure in standards or SOPs or a failure with equipment include details of how the mine/UXO was discovered or the failure occurred.
- Note: 8 Provide contact details of the person(s) responsible for the coordination of the immediate response to the demining incident and investigation activities, for example the Worksite Supervisor and the Operations Manager. Provide radio callsigns or telephone numbers as appropriate.
- Note: 9 Provide as much information as possible about the circumstances surrounding the incident, specifically information which would assist in making decisions on the requirement to send out a general warning about a new device found or the inadequacies of equipment, a standard or SOP.
- Note: 10 Submission of the complete demining incident report should not be delayed in an effort to collect and analyse information regarding the incident.

Appendix 2 to Annex C (Informative) Example of a demining incident detailed report

From: Demining organisation name. **See notes 1, 2 and 3** Date report submitted.

To: NMAA/MAC, programme name.

Subject: **Demining Incident Detailed Report**

References:

- A. Demining incident initial report (copy attached).
- B. Programme national mine action standards.
- C. Demining organisation SOPs.

Part one – background (This is a summary of some of the information from the initial report)

- 1. Demining organisation name.
- 2. Organisation sub unit, site office/project number, team name/number.
- 3. Name of Worksite Supervisor.
- 4. Location of incident (province, district, village, task no).
- 5. Date and time of incident.
- 6. Type of incident. (See clause 4.1.1)

Part two – details of incident

7. Provide a general description of how the incident occurred including locations; timings; demining personnel (demining teams, MDD teams and mechanical teams) and any non demining personnel involved; mines, UXOs or explosives involved; and vehicles/equipment involved. Attach photographs, diagrams and incident plans (location plan and detailed site plan) as Annexes to the report to assist in clarifying the circumstances surrounding the incident. **See notes 4, 5 and 6**

Part three – incident site conditions

8. Describe the conditions on the incident site at the time of the incident in terms of worksite layout and marking, ground and terrain, vegetation and weather:

- a) Worksite layout and marking. Describe the layout of the worksite in relation to the location of the incident covering control areas, general worksite markings and specific worksite markings in the location of the incident. Include dimensions and cross reference to SOPs where appropriate. Consider such things as the effects of the sun and weather on the worksite layout. Include details of the worksite layout on incident plans attached as an Annex to the report.
- b) Ground and terrain. Describe the ground in terms of type of soil, density or hardness and moisture content. Describe the terrain in terms of flat, undulating or hilly. If required use slope ratios (i.e. 1 in 25) to identify maximum/minimum slopes.

- c) Vegetation. Describe the vegetation in terms of type, density, size and root structure. Provide dimensions such as height of grass/crops/bush and maximum size of the vegetation stems. Indicate if the roots had an effect on the work or if the vegetation had been burned or cleared in any way.
- d) Weather. Describe the weather at the time of the incident.
- 9. Provide photographs of the site to highlight the incident site conditions.

Part four – team and task details

10. Team details. Provide details of the size and composition of the team (deminers, section leaders, team leaders, supervisors, medics etc), including MDD or mechanical teams; the qualifications (formal and refresher training) and experience (types of work carried out, locations, worksite conditions and mines, UXOs or devices encountered); the most recent refresher training and subjects covered; the last period of leave/stand down; the results of recent monitoring (both internal and external) carried out on the team; and any known problems with the team. Provide a comparison between the team in general and any individuals involved in the incident.

11. Task details. Provide details of the task to include the survey work carried out (general and technical); clearance plan for the task, which should include area to be cleared and depth of clearance; types and number (if known or able to be estimated) of mines expected to be found; any known mine laying techniques or patterns; the planned use of the land after clearance; time worked on the task; progress in terms of area cleared as a percentage of the total area to be cleared; types and numbers of items found; and any problems encountered with the task.

12. Include copies of training records, monitoring reports, survey reports, clearance plans, task progress reports or any other demining organisation or demining worksite administration documentation required as an Annex.

Part five – equipment and procedures used

13. Equipment used. Provide details of the equipment being used on the site relevant to the incident. This may cover detection equipment, Personal Protective Equipment (PPE), deminer's toolkits, demolition equipment, communication equipment, medical equipment, vehicles and mechanical equipment. For electronic detection equipment provide details of on site testing requirements. This may be referenced to SOPs.

14. Procedures used. Provide an overview of any procedures used related to the incident. This may be referenced to SOPs.

15. Work routines. Provide details of the work routines being followed on the task at the time of the incident and the number of hours worked by personnel (including those involved in the incident) on the day prior to the incident occurring. If work routines involve handovers between personnel, provide details of when the last handover occurred prior to the incident and the details of what is covered during handovers for example, detection equipment checks, briefings etc. This may be referenced to SOPs.

Part six – explosive hazards involved

16. Provide details of any mines, UXOs, explosive devices or explosives that were involved in the incident:

- a) For items that were located (mines, UXOs or devices), or explosives that were known to be used provide details such as; (1) mines/UXOs - common names; (2) explosive devices - a detailed description of the components (name, type, size or weight) and construction details; (3) for known explosives - the names, type, size or weight of the items used. For items located also include the position in/on the ground (i.e. surface or buried and if buried depth and attitude in the ground) and whether item was trip wired, command detonated or booby trapped.
 - b) For incidents involving a detonation provide details of blast holes (size and depth); mine/UXO or other debris located and any known or suspected items involved. Provide explanations as to why an item is either known or only suspected.
17. Provide photographs and technical details for any items located or photographs of blast holes and debris as an Annex to the report.

Part seven – details of injuries

18. Provide details of all personnel (including non demining workers) injured as a result of the incident. Include names, occupation, details of injuries and cross reference the names to the activities that the personnel were carrying out at the time of the incident. All injured personnel no matter how minor the injuries they received are to be included. Also include copies of medical records and injury data sheets as Annexes to the report. An example of an injury data sheet is included at Appendix 3 to this Annex. The location of the injured personnel, immediately after the incident occurred, should be shown on the incident detailed site plan.

Part eight – equipment/property/infrastructure damage

19. Provide details of all equipment, property or infrastructure damaged as a result of the incident:

- a) For equipment include detailed descriptions to include owner, make, model, age, serial numbers (where applicable), current value (if known), details of damage, insurance held by the owner/organisation and if possible an assessment of the cost of repair/replacement. (See clause 20 below for the requirements covering PPE involved in the incident)
- b) For property and infrastructure provide details of the owner(s), damage incurred, insurance held by the owner(s) and if known the cost of restitution or repair.

20. PPE. Provide details of any PPE involved in the incident by type/function, make, model or any other identifying details. Describe any damage to the PPE and provide comment as to the effectiveness or otherwise of the PPE in preventing injury (or more serious injury) to personnel involved in the incident.

21. Include photos of damaged equipment, property or infrastructure and copies of any other supporting evidence (ownership papers, property deeds, insurance details, repair quotes etc) as Annexes to the report.

Part nine – medical and emergency support

22. Provide details of the medical and emergency support (communications and evacuation transport) available at the incident site prior to the incident occurring. This may be cross referenced to SOPs. Also if applicable to the incident, include details of the frequency of demining accident response plan practices and the date the last practice was carried out.

23. Provide timings for key activities during the casualty evacuation for example the evacuation of the casualty(ies) off the incident site, the arrival at the initial medical facility, departure from the initial medical facility and arrival at the final medical facility.

24. Comment on the effectiveness or otherwise of the medical and emergency support in terms of planning and preparation, medical equipment and supplies, communications, evacuation transport, medical treatment facilities and external support (from other mine action organisations) to the casualty evacuation. Where deficiencies were identified provide details and recommendations for improvements.

Part ten – reporting procedures

25. Comment on the effectiveness or otherwise of the initial incident reporting procedures carried out.

Part eleven – any other matters of relevance. See note 7

26. Include any other matters relevant to the incident that have not already been covered in this example.

Part twelve – discussion, conclusions and recommendations

27. Provide any additional discussion, conclusions and recommendations made.

Signature of Investigating Officer

Name of Investigating Officer

Annexes:

- A. Copy of the initial demining incident report.
- B. Witness statements.
- C. Incident location and detailed site plans.
- D. Site photographs.
- E. Training records, monitoring reports, survey reports, clearance plans, task progress reports or any other demining organisation or demining worksite administration documentation required.
- F. Photographs and technical details of items located, blast holes or mine/UXO debris.
- G. Medical records or injury data sheets.
- H. Photographs of damaged equipment, property or infrastructure.
- I. Copies of equipment/property ownership documentation (ownership papers, property deeds, insurance details etc).
- J. Damage repair quotes/estimates.
- K. IMSMA Demining Accident Report and Casualty Report. **See note 8**

Note: 1 The demining incident detailed report shall be prepared as soon as practically possible after the incident has occurred. The report shall be completed by an appropriately qualified and experienced investigating officer (IO) from the demining organisation involved, but this shall not be any person directly involved in the incident.

Note: 2 In some situations the demining incident detailed report may constitute the formal incident investigation. See Appendix 1 to Annex D.

- Note: 3 The NMAA should set the time limit for demining organisations to complete the demining incident detailed report with details included in national mine action standards.
- Note: 4 For accidents (see clause 4.1.1 a and f) include details of the activities being carried out when the accident occurred.
- Note: 5 For mine(s)/UXO(s) located in a cleared area (see clause 4.1.1 c) include details of how the mine(s)/UXO(s) was/were discovered, the type(s) of mine(s)/UXO(s) involved, the exact location(s) (by GPS or resection if it can be done safely), classification of the area where the mine(s)/UXO(s) were located and any known details of previous demining (technical survey or clearance) in the area.
- Note: 6 For a failure in standards or SOPs or a failure with equipment (see clause 4.1.1 d) provide details of the procedures or equipment involved, how the failure was discovered/occurred and potential consequences of the failure if not rectified.
- Note: 7 Not all of the parts in this example are applicable to all incidents required to be reported.
- Note: 8 Where appropriate IMSMA reports could be used for summary reporting of demining incidents but an IMSMA report is not a substitute for a 'demining incident detailed report'.

Appendix 3 to Annex C (Informative) Example of an injury data sheet (see note 1)

Demining organisation name:

Location (province, district, village, task no):

Casualty name or CIN:

Explain the cause of injury (ies): **See note 2**

Organisation sub unit, site office/project number, team name/number:

Date and time of incident:

Gender and age:

Legend	
Code	Meaning
A	Abrasions
AM	Amputation
TAM	Traumatic amputation
B	Burn/discolouration
D	Dislocation
F	Fracture
FR	Fragment
H	Haemorrhage
IH	Internal haemorrhage
L	Lacerations
LO	Loss of function

- Note: 1 **Instructions for completing the form.** Place an 'X' in each box indicating parts of the body where there was no noticeable injury. For parts of the body that were injured place the relevant code(s) in the box. Codes are shown in the legend. It may not be possible to indicate all injuries without specialist medical advice.
- Note: 2 Cause of injuries should be kept to one phrase for example, 'stepped on PMN mine'; 'secondary fragmentation from POMZ mine'; or 'cut leg using chainsaw'.

Annex D (Informative) Example of demining incident investigation SOP

Title: Investigation of demining incidents.	No: IMAS 10.60	Date: 01/10/04	
Intent: Improve safety and quality in demining through the collection, analysis and dissemination of information on the circumstances surrounding a demining incident.	Process user: Operations manager.		
	Process owner: Director operations.		
Process description	Responsibility		
	Demining Org(s)	NMAA/MAC	BOI/IO
Demining incident Implement demining organisation's emergency response SOP and incident-site preservation SOP. Submit demining incident initial report (two parts). See Appendix 1 to Annex C for an example of a demining incident initial report.	○ →	□	
Determine level of investigation required. See Appendix 1 to this Annex for a guide for selecting an appropriate level for a formal investigation.		□	
Is a Board of Inquiry (BOI) or independent investigation required?		◇	
Demining incident detailed report. See note 1 below. Demining organisation completes demining incident detailed report. See Appendix 2 to Annex C for an example of a demining incident detailed report.	○ →	□	
Draft Terms of Reference (TOR) for formal investigation Include copy of demining incident detailed report. See Appendix 2 to this Annex for an example of TOR for a formal investigation.		□	
Appoint BOI or independent IO Provide BOI/IO with TOR for formal investigation and provide copies to organisation(s) involved. Provide BOI/IO with administrative support needed, i.e. transport, accommodation and meals.	□		□
BOI/IO undertake investigation in accordance with TOR, with support and assistance from the organisation(s) and demining workers involved in the incident.			□
Is the formal investigation and report completed on time?			◇
Submit interim report Provide update on progress to date, advise reason for delay and expected date of completion.	□	□	yes
Submit final report Ensuring that report is accurate, clear, concise and complete.		□	□
Analyse report and disseminate information on findings Send information to demining organisations and UNMAS.	□	□	
Document report in data base Analyse trends. Disseminate information on trends. Include incident on agenda of next technical working group.	□	□	
Note: 1 The requirement for demining organisations to complete a demining incident detailed report should be mandatory irrespective of the level of formal investigation required. If the NMAA/MAC then decides that an internal formal investigation is all that is required then the demining incident detailed report becomes the formal investigation.	Legend Documents □ (multiple) □ Process □ Decision ◇ Multiple responsibility ■ Connector ○		

Appendix 1 to Annex D (Informative) Guide for selecting the level for a formal investigation

	Type of formal investigation		
	Board of Inquiry	Independent Investigation	Internal Investigation
1. A demining accident resulting in:			
a. minor injury to a demining worker.			
b. serious injury to a demining worker.			
c. death of a demining worker.			
d. any injury to a non-demining worker.			
e. death of a non-demining worker.			
2. A demining incident:			
a. resulting in damage to demining organisation equipment of value less than US\$ 5,000.00.			
b. resulting in damage to demining organisation equipment of value from US\$ 5001.00 to US\$50,000.			
c. resulting in damage to demining equipment of value more than US\$50,000.			
d. causing damage that may result in a major claim for compensation from a member of the public.			
e. involving a major event that caused significant damage.			
3. A demining incident:			
a. involving the discovery of a mine or UXO in an area previously cleared, recorded as cleared or marked as cleared.			
b. where demining workers, visitors or the local population are exposed to intolerable risk that results from the application of approved standards or procedures including the failure of equipment.			
c. involving the unplanned detonation of a mine, UXO or explosives on a demining worksite.			
d. which could attract media attention or media report.			
4. A non mine, UXO or explosive related accident:			
a. on a demining worksite that requires the urgent evacuation of a casualty to an advanced medical facility for treatment.			

Note: 1 Boards of Inquiry (BOI) should comprise a minimum of three appropriately qualified and experienced members of the senior or technical management within a mine action programme. The principal member from the NMAA/MAC, one member from a third party demining organisation and one member from the organisation involved with the incident, but this shall not be any person directly involved in the incident.

Note: 2 The independent investigation shall be carried out by an appropriately qualified and experienced independent Investigation Officer (IO) appointed by the NMAA/MAC.

Note: 3 The internal investigation shall be carried out by an appropriate qualified and experienced member of the demining organisation involved, but this shall not be any person directly involved in the incident.

Appendix 2 to Annex D
(Informative)
Example terms of reference for a formal investigation

	NMAA/MAC name
	Address
	Location
File reference (incident serial number)	Date
Name of recipient(s)	
Address	
Location	
APPOINTMENT OF PERSONNEL TO CARRY OUT A FORMAL INVESTIGATION	
Reference:	
A. Programme name national mine action standards.	
B. Demining incident detailed report. (Copy attached)	
1. You (name(s) of organisation(s)) are hereby appointed by (name and appointment) of the NMAA/MAC to investigate the circumstances surrounding the demining incident that occurred on (time and date) at (location) involving (personnel from, if applicable to the incident) (organisation name).	
2. This incident involved (a brief note as to what the incident was about for example 'a deminer detonating a mine whilst carrying out manual clearance'; or 'the discovery of a mine in an area previously cleared').	
3. Your formal investigation and report are specifically to cover the following:	
a) Details of the task(s) being carried out at the time of the incident.	
b) When and where the incident occurred.	
c) How the incident occurred including a description of the events that led up to the incident, personnel, equipment and procedures involved.	
d) The cause, nature and extent of injuries caused to personnel or damage to equipment, property or infrastructure as a result of the incident.	
e) Why the incident occurred and whether the incident could have been avoided.	
f) Any remedial action necessary to prevent future incidents of this nature occurring.	
g) Any other matters that the BOI/IO considers relevant to the incident.	
4. In investigating the incident the following factors are to be considered:	
a) The level of training and experience of the personnel involved in the incident, including where applicable, supervisory and managerial staff. This should also cover the dates and subjects covered for the most recent refresher training for the team, including if the members involved in the incident attended that refresher training.	

- b) The work routines being followed prior to and at the time of the incident including work start and finish times and rest period routines. Investigate if any handovers were occurring between personnel working on the site and procedures followed for these handovers including any briefings involved.
 - c) The dates of the last leave period or day off work for personnel involved in the incident.
 - d) The dates and results of recent monitoring (internal and external) of the team involved in the incident.
 - e) The procedures being followed by the personnel involved in the incident for the activities being carried out at the time of the incident.
 - f) The safety equipment or protective clothing required to be used, or worn by the personnel involved in the incident, and whether the equipment or clothing was worn or used and if so, whether it was done so correctly. Also consider whether the use of safety equipment or protective clothing contributed to, or could have contributed to, a reduction in any injuries to personnel.
 - g) The medical and emergency support available to the team/personnel involved in the incident and whether this support was adequate or not in the circumstances of the incident. If the medical support was not adequate consider the possible affect this may have had on any casualties resulting from the incident.
 - h) Whether the incident was contributed to or caused by any of the following:
 - (1) Any weakness in command and control.
 - (2) Neglect, carelessness or misconduct by any of the personnel involved.
 - (3) Personnel being given inappropriate or dangerous orders by supervisory or managerial staff.
 - (4) Non-compliance with orders, instructions or procedures.
 - (5) The use of alcohol, drugs or prescribed medication.
 - (6) Deficiencies in standards or SOPs.
 - (7) Incorrect use of equipment.
 - (8) Any shortfall in training of personnel involved.
 - (9) Injury or sickness to any personnel involved in the incident.
 - (10) Malfunctioning of equipment or materials, including explosives.
 - (11) The prevailing weather conditions.
 - (12) Any deficiencies in basic support to personnel on the site for example provision of primary health care, shelter, food and water.
5. The report is to summarise the results of the investigation, draw conclusions as to the factors that contributed to the incident and make whatever recommendations necessary to prevent a future incident of this nature occurring.
6. The following documents should be included with the report:

- a) A copy of the document appointing personnel to carry out a formal investigation (this document).
- b) A copy of the demining incident detailed report from the organisation involved in the incident.
- c) Witness statements.
- d) Sketches, diagrams, location and site plans as appropriate.
- e) Photographs highlighting important aspects of the incident for example site conditions; mines, UXO, explosive devices or explosives involved; blast holes and blast debris; injuries to personnel; and equipment, property or infrastructure damage.
- f) Task documentation, which may include survey reports, clearance plans, demining worksite plans or demining worksite documentation.
- g) Extracts from standards and SOPs as required.
- h) Medical records or coroner's reports.
- i) Any further documentary evidence gathered during the investigation.

7. The investigation report is to be submitted by (time and date). In the event that the completed report is not able to be submitted on the date indicated an interim report outlining progress with the investigation and the reason for the delay is to be submitted on that date and further interim reports provided every () days until the completed investigation report is submitted.

Signature of appointing authority
Name of appointing authority

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
1	1 Dec 2004	1. Formatting changes. 2. Minor text editing changes. 3. Changes to terms, definitions and abbreviations where necessary to ensure that this IMAS is consistent with IMAS 04.10. 4. Substantive changes: a) Clause 4.1.1. Major text changes and the inclusion of a new sub clause 'f'. b) Clause 4.1.2. Complete rewrite and the inclusion of two new sub causes 4.1.2.1. And 4.1.2.2. c) Clause 4.1.3. New clause. d) Clause 4.2.1. Major text changes. e) Clause 4.2.2. Major text changes. f) Clause 5.1. Text change to sub clause 'b'. g) Annex C. Major changes throughout. h) Annex D. Major changes throughout.
2	23 Jul 2005	1. Introduction, first paragraph, new sentence added concerning the aim of an investigation. 2. Clause 4.1.2.2. Third sentence, removal of the word 'prepared' and the replacement of it with 'completed'. Inclusion of a new fourth sentence concerning reporting non demining incidents. 3. Clause 4.2.1, second paragraph. Sub clause i), inclusion of a new opening phrase. Previous sub clause f) changed to a note with some rewording. 4. Clause 4.2.2. Fifth paragraph sub clause b), inclusion of a phrase concerning personnel conducting investigations not being involved in incidents. First note, changes to the second sentence concerning the members of a BOI. 5. Clause 5.1, sub clause c), wording changed. 6. Appendix 2 to Annex C, note 8, change concerning the use of IMSMA reports.