

IMAS: 1997 Standards Chapter 3

Section Three: Survey

INTRODUCTION

3.1 In order to establish a Mine Action Plan based on governmental and regional priorities, areas that are suspected of being mined or are mined must be quickly identified. These records form part of the Mine Survey database and are a major planning tool in the prioritisation of tasks and the commitment of mine clearance resources. Information obtained from the various mine awareness programmes form an important part of the initial Level One survey data.

SCOPE

3.2 This document addresses the standards for the levels of survey and covers terminology, recording and survey operations. It should be read in conjunction with the standards for mine clearance.

PURPOSE

3.3 To establish standards for survey activities in order to record the location and actual area of the mine-affected locations.

DEFINITIONS OF SURVEY LEVELS AND REPORTS

3.4 A survey has three specific functions or levels: information gathering of a suspected mine or UXO area, a detailed topographical survey including area reduction and marking, and the completion survey. The three 'Levels' of survey are required in order to gather, collate, refine and record all available information about the mine threat, its location and extent. All Levels survey are to be recorded on the same form, an example of which is enclosed as Annex A to Section 3. The following definitions for the levels of survey are to be used:

LEVEL ONE: GENERAL SURVEY

3.5 The objective of a Level One: General Survey is to collect information on the general locations of suspected or mined areas. Information must be collected about the areas affected by mines or UXO and areas that are not affected. Areas must be categorised and the reliability and credibility of data recorded. The categorising system is detailed in Section Nine. A Level One: General Survey is a prerequisite for the planning of a Level Two: Technical Survey. The content and level of detail will vary according to the level of survey undertaken.

3.6 Survey teams are to record survey mapping activities on a sketch at a scale no smaller than 1: 10,000.

LEVEL TWO: TECHNICAL SURVEY

3.7 The objective of a Level Two: Technical Survey is to determine and delineate the perimeter of mined locations initially identified by a Level One: General Survey. The marked perimeter forms the area for future mine clearance operations. The Level Two survey requires trained and properly equipped mine clearance personnel with the necessary skills to undertake and accurately record the survey work. Where possible, with time and resources permitting, these teams should also undertake area reduction work in order to accurately define the outer perimeters of the minefield.

3.8 Survey teams are to record survey mapping activities on a sketch at a scale no smaller than 1: 10,000.

LEVEL THREE: COMPLETION SURVEY

3.9 The Level Three: Completion Survey is conducted in conjunction with the mine clearance teams and accurately records the area cleared. The benchmark is to be left in the ground to serve as a minimum marker of the initial minefield area. It is also recommended that permanent markers be used to indicate turning and intermediate points of the perimeter of the mined area.

3.10 Once the clearance task has been partially or totally completed a clearance report which, with the Level Three : Completion Survey and in some cases a Quality Assurance check, will form the basis for the documentation necessary for the issuing of an authorized acceptance certificate.

SURVEY REPORTS

3.11 The reporting format must be standardised at all levels of survey and an example of the standard form is enclosed as Annex A to Section Three. All survey forms are to be prepared in both the national and one of the six major UN recognised languages (Arabic, Chinese, English, French, Russian, Spanish).

INFORMATION SOURCES, CLASSIFICATION AND SURVEY RECORDS

INFORMATION SOURCES

3.12 Information gathering should include, but is not limited to the following sources:

- a) Governmental departments;
- b) United Nations organisations such as WFP, UNICEF and UNDP;
- c) Military Units, including Force HQs and Engineer units;
- d) Police stations;
- e) Local hospitals;
- d) Mine and UXO clearance organisations;
- e) Prosthesis centres;
- f) Mine Awareness programmes and local personnel.

INFORMATION CLASSIFICATION

3.13 Mine information is to be categorised as : unknown, suspected (high and low risk) , reported, and cleared. The reliability and credibility of the reported information is to be indicated using the M1 to M4 system confidence levels as detailed in Section Nine - Minefield Information Management Standards.

SURVEY RECORDS AND REPORTS

3.14 Before initiating survey operations standards must be established for the recording of information so that it will be in an acceptable format for analysis. Records must be kept in both written, graphic and digital formats, where possible, so that information can be transferred by digital and hard- copy medium to facilitate archiving and to provide a back-up.

3.15 The minimum level of information depends on the requirement of the authorising body and varies depending on the survey level. The required information for the various levels of survey is identified on the Survey form.

3.16 The status of information can only be changed when supported by a written formal report.

3.17 Mine information reports form historical data and should always be archived and never destroyed.

TEAM COMPOSITION, TRAINING AND QUALIFICATIONS

3.18 The survey team is to consist of a minimum of two personnel trained in survey and demining (one to act as the team leader) and must include a medical orderly or paramedic. Where possible the medical orderly/paramedic should have some basic knowledge of mine clearance operations. The

survey teams are to be trained to the standards detailed in Section Two: Training and Qualifications, their duties and methods of operation should be outlined in greater detail in the SOPs.

COORDINATE SYSTEMS AND GPS

3.19 The default system for benchmark and landmark coordinates is to be latitude and longitude. UTM, MGRS or other reference systems can also be used at the local level, however, the type, projection and datum point must be indicated in the database and sketch maps. This is to allow accurate transposing of information to other base maps.

3.20 Where possible, a Global Positioning System (GPS) should be used to get a fix on the centre of a point. Because of the errors inherent in current hand held GPS systems they are not to be used for coordinates of turning points on a perimeter. Major landmarks, incidents and the minefield benchmarks may be fixed with hand held GPS. Differential GPS with an error of ± 5 cms may be used for turning points. The use of differential GPS is not covered in this document.

MINEFIELD MARKING AND AREA REDUCTION

MINEFIELD MARKING

3.21 The purpose of minefield marking is to create a visual demarcation of the mined area to warn people of the presence of mines. Mine marking may involve construction of a physical barrier to warn and prevent people and livestock from accidentally entering a mined area. The types, methods and standards for mine and minefield marking are detailed in Section Four - Minefield Marking.

AREA REDUCTION AND EXPLORATORY BREACHES

3.22 Area reduction is an essential part of the Level Two Survey task. It can be undertaken by a variety of methods. The SOP is to clearly state the manner and methods to be utilized.

3.23 If exploratory breaches are used, the drills and methods utilized are to be outlined in the SOPs.

3.24 Landmarks and benchmarks must be accurately recorded to a maximum error of ± 10 metres and the outer perimeter is to be surveyed by use of a closed traverse with an error or misclose of 1 metre.

3.25 Once the minefield outer perimeter has been clearly defined, it is recommended that a safety zone is created between the defined mined area and the perimeter fence. This area is to be marked as detailed in Section Four - Minefield Marking and details stipulated in the SOPs.

DOGS AND MECHANICAL EQUIPMENT

3.26 Dogs and mechanical equipment should be used to assist in both survey and area reduction tasks. The methods of work are to conform to the relevant standards outlined in this document. The drills and methods used are to be specified in the SOPs.

MEDICAL SUPPORT

3.27 The survey team, if detached from the immediate area of other mine and UXO clearance activities, must have the same medical support standards as that detailed in Section Seven - Medical.

MINEFIELD INFORMATION SYSTEMS

MINEFIELD INFORMATION SYSTEMS

3.28 The purpose of a minefield information system is to manage the cumulative information obtained from reports submitted by the mine awareness, minefield survey, mine clearance teams and other sources. Data should be stored in both document and digitised format.

3.29 Standards for recording and managing information resulting from minefield survey and clearance operations are explained in Section Nine - Minefield Information Management Systems.

3.30 Copies of all survey information, reports and sketches are to be given to the National or Mine Action Centre database.

Annex A to Section 3
Survey Form

Type of Report:	Marking	Level 1 Survey	Level 2 Survey	Level 3 Survey
Task No:			Date into Database (dd/mm/yy):	
ID No for mined Area:			Entered By:	
Report No:			Report Date (dd/mm/yy):	

Survey Team Data

- 1 **Organisation:**
- 2 **Marking/Survey Team Supervisor:**
- 3 **Marking/Survey Team Leader:**
- 4 **Start of Marking/Survey (dd/mm/yy):**
- 5 **Finish Of Marking/Survey (dd/mm/yy):**
- 6 **Level 1 Survey conducted by:**
- 7 **Level 2 Survey Conducted by:**
- 8 **Clearance Organisation:**
- 9 **Clearance Supervisor:**
- 10 **Clearance Team Leader:**
- 11 **Clearance Start (dd/mm/yy):**
- 12 **Clearance Finish (dd/mm/yy):**
- 13 **Level 3 Survey Conducted by:**
- 14 **Verification Conducted by:** **When (dd/mm/yy):**
- 15 **QA Conducted by:** **When (dd/mm/yy):**

Mapping Information

- 16 **Name of Nearest Town:**
- 17 **Coordinates (Grid Ref):**
- 18 **Municipality:**
- 19 **Canton:**
- 20 **Map Name:** **Map Series:**
- 21 **Map Sheet:** **Map Edition:**
- 22 **Map Scale:** **Map Datum:**
- 23 **Map Projection:** **Grid /Coordinate System:**

Mined Area Location Information

- 24 **Landmark Coordinates (Lat Long (Deg/Min/Sec))**
- 25 **Landmark Description:**
- Coordinates fixed by:** GPS Resection
- 26 **Benchmark Coordinates (Lat Long (Deg/Min/Sec))**

27	Benchmark Description:		
	Coordinate fixed by:	GPS	Resection
28	Datum Point Coordinates (Lat Long (Deg/Min/Sec))		
29	Datum Point Description:		
	Coordinates fixed by:	GPS	Resection
30	Benchmark identified ? (shown on sketch map)	yes	no
31	Safe Lane identified ? (shown on sketch map)	yes	no
32	Datum Point identified ? (shown on sketch map)	yes	no
33	Safe Areas identified ? (shown on sketch map)	yes	no

Perimeter of Mined Area

	From	To	Bearing	Dist(m)	Grid Coord	TP	IP
34	Landmark	Benchmark					
35	Benchmark	Datum Pt					
36	Datum Pt	TP1				1	
37							
38							
39							
40							
41							
42							
43							
44							
45							
46							
47							
48		Datum Pt					

Minefield Information

49	Who laid the mines/UXO?					
50	When was the minefield laid?					
51	Is the mined area marked? Show on Map	Yes	No	By Who:		
52	Was there fighting in this area?	Yes	No			
53	Final use for Cleared Area:					
		Refugee/IDP	Agriculture	Utilities	Development Project	
		UN Site	NGO/Aid	Line of Comms	Other	
54	Depth of Clearance Recommended:				Actual Depth Cleared:	
55	Reliability of Information:		M1	M2	M3	M4
56	Confidence Level:		1	2	3	4
57	Assessed Risk:		High	Low		

Mine/UXO Type Information

58	Device types in area:	AT	AP	UXO	Mixed
59	Type:	Model:	Number:	BT/Anti lift fitted:	

60 **Type:** **Model:** **Number:** **BT/Anti lift fitted:**
 61 **Type:** **Model:** **Number:** **BT/Anti lift fitted:**

Clearance Operation Data

62 **Number of Clearance Units used:**
 63 **Manual methods used:**
 64 **State SOP for manual method employed:**
 65 **Dog methods used:**
 66 **State SOP for dog method employed:**
 67 **Mechanical method used:**
 68 **State SOP for mechanical method employed:**
 69 **Combination method used:**
 70 **State SOP for combination method employed:**
 71 **Mine/UXO destruction methods used:**
 72 **Metal detectors used?** Make: Model: Mk:
 73 **Metal detectors used?** Make: Model: Mk:
 74 **Maximum detection depth in cm:**
 75 **Total area cleared:**
 76 **Problems encountered during clearance task?**
 77 **Areas/Obstacles left uncleared:**
 78 **Description:**
 79 **Method of marking:**

Terrain Data

80 **Type of Location:**
 Urban Coast Rural Wooded
 Mountain Agricultural Industrial Open
 Mix Battlefield Other
 81 **Soil Type:**
 Clay Chalk Stony Ploughed
 Sand Loam Mixed Other
 82 **Soil Conductivity/Anomalies:**
 83 **Water Table Depth and Conditions:**
 84 **Prominent Ground Features:**
 85 **Slope:**
 0-5% 5-10% 10-15% 15-20%
 20-25% 25-30% 30+%
 86 **Drainage Features:**
 Rivers Lakes Canals Drainage
 Ditches Irrigation Channels
 87 **Can the vegetation be removed by burning or chemicals:**
 Burning Chemicals No
 88 **Was the vegetation be removed by:**
 Burning Chemicals Mechanical Manual
 89 **Control Measures:**
 Fire Breaks Local Fire Service Fire Appliances Run Off control
 90 **Description of Control Measures taken:**
 91 **Prevailing Wind Direction:**

AM:	N	NE	E	SE	S	SW	W	NW
PM:	N	NE	E	SE	S	SW	W	NW

Road Access Data

- 92 **Nearest town:**
- 93 **Distance from town to minefield (in km):**
- 94 **Travel time between town and minefield:**
- 95 **Route/highway name:**
- 96 **Route Type:**
- | | | |
|----------------------|----------------------|---------------------|
| All weather wheeled | All weather tracked | Limited All Weather |
| Fair weather wheeled | Fair weather tracked | Other |
- Describe:**
- 97 **Route Classification:**
- | | |
|------------|----------------|
| Load Class | Maximum Weight |
|------------|----------------|
- 98 **Number of Lanes:**
- | | | | |
|---|---|---|------|
| 1 | 2 | 4 | More |
|---|---|---|------|
- 99 **Width (meters):**
- | | | |
|---------------|------------|----------|
| Carriage way: | Shoulders: | Ditches: |
| Total width: | | |

Bridge Access Data

- 100 **Bridge Classification:**
- | | |
|------------|----------------|
| Load Class | Maximum Weight |
| One way | Two way |
- 101 **Bridge Type:**
- 102 **Number of Lanes:**
- | | | | |
|---|---|---|------|
| 1 | 2 | 4 | More |
|---|---|---|------|
- 103 **Bridge Condition:**
- | | | | |
|---------------|--------------|--------------|----------------|
| Good two ways | Good one way | Poor one way | Cannot be used |
|---------------|--------------|--------------|----------------|
- 104 **Bridge Span (m):**

Hand Over Data

- 105 **Area to be handed over to:**
- 106 **Marking maintenance confirmed:**
- 107 **Mine Awareness conducted for local inhabitants:**

Administration and Logistic Data

- 108 **Proposed Accommodation:**
- 109 **Nearest water supply:**
- 110 **Nearest food supply:**
- 111 **Electricity supply:**
- | | |
|-----|----|
| Yes | No |
|-----|----|
- 112 **Fuel available:**
- | | | |
|-----|----|--------|
| Yes | No | Where: |
|-----|----|--------|
- 113 **Telephone:**
- | | | |
|-----|----|--------|
| Yes | No | Where: |
|-----|----|--------|
- 114 **Secure Storage/Parking:**
- | | | |
|-----|----|--------|
| Yes | No | Where: |
|-----|----|--------|
- 115 **HF Radio checked to HQ and Spt elements:**
- | | | | | |
|-----|------|------|------|----|
| Yes | Good | Fair | Poor | No |
|-----|------|------|------|----|
- 116 **VHF Radio checked to HQ and Spt elements:**
- | | | | | |
|-----|------|------|------|----|
| Yes | Good | Fair | Poor | No |
|-----|------|------|------|----|
- 117 **Helicopter Landing Site:**
- | | | |
|-----|----|--------------|
| Yes | No | Coordinates: |
|-----|----|--------------|
- 118 **Airstrip:**
- | | | | |
|-----|----|--------------|----------------|
| Yes | No | Coordinates: | Runway legnth: |
|-----|----|--------------|----------------|
-

Contact Details

119 Nearest UN site:

Call sign:	Freq:	Channel:	
Coordinates:	Appt:	Tel:	
Contact:	Address:		
Time to site:	Cas data:	Yes	No

120 Police Station:

Call sign:	Freq:	Channel:	
Coordinates:	Appt:	Tel:	
Contact:	Address:		
Time to site:	Cas data:	Yes	No
Time to site:	Cas data:	Yes	No

121 Level 1 medical site:

Call sign:	Freq:	Channel:	
Coordinates:	Appt:	Tel:	
Contact:	Address:		
Time to site:	Cas data:	Yes	No

122 Level 2 medical site:

Call sign:	Freq:	Channel:	
Coordinates:	Appt:	Tel:	
Contact:	Address:		
Time to site:	Cas data:	Yes	No

123 Level 3 medical site:

Call sign:	Freq:	Channel:	
Coordinates:	Appt:	Tel:	
Contact:	Address:		
Time to site:	Cas data:	Yes	No

124 Medevac:

Call sign:	Freq:	Channel:	
Coordinates:	Appt:	Tel:	
Contact:	Address:		
Time to site:	Cas data:	Yes	No

Completed By
Position
Signature
Date

Checked By
Position
Signature
Date