



LIS Operational Protocol P06 v 3 – Visual inspection

1.0 Purpose

1.1 The purpose of this protocol is to provide guidelines for visual inspection of suspected hazard areas (SHA). Visual inspection shall be done after a community interview in order to confirm a suspected hazard area's existence, to provide data for future technical surveys and to inform the public about proximate outer boundaries of SHAs.

2.0 Overview

2.1 A LIS consists of a group interview and community mapping exercise where the community lists SHAs known to them and how they affect the community. After the group interview and community mapping exercise, interviewers will visually inspect suspected hazard areas and collect information that will be useful in the future for technical surveys and other mine action. Polygon mapping should be conducted for each SHA. If interviewers are not trained in polygon mapping, specialist mapping teams will visit priority suspected hazard areas as a separate task.

3.0 Responsibilities

3.1 SAC staff is responsible for ensuring that sufficient time, funding, equipment, personnel and technical training are provided for the mapping requirements of this protocol at the time of the Advance Survey Mission.

3.2 SAC and HQ staff is responsible for training interviewers in visual inspection.

3.3 Interviewers will conduct visual inspection according to the guidelines set forth in this protocol.

4.0 Definitions

4.1 *Visual inspection*: Observation from a safe viewing point for the purpose of recording information on the suspected hazard area supplementary to information indicated by the interview group during the community mapping exercise. The visual inspection visit allows interviewers to record a visual description of the SHA as seen from a safe viewing point. The interviewers record this description, in addition to any supplementary data, on the SHA from key informants.

4.2 *SHA*: Suspected Hazard Area; Suspected landmine and / or UXO areas as identified by key informants during the community interview process. The SHA is the area of perceived hazard, and not necessarily the exact contaminated area.

4.3 *Safe Viewing Point*: One or more safe locations outside of the SHA used to locate a marked and recorded hazard or hazardous area and from where interviewers will conduct visual inspection. A safe viewing point will be a fixed point of reference visible from 30m in normal daylight conditions from the normal direction of approach. A safe viewing point will serve as a reference point for any follow-up activity.

4.4 *Starting Point*: A fixed point on the edge of the hazardous area from which the other turning points are plotted. The starting point should be able to be identified by the interviewers and key informants from a safe viewing point during the visual inspection.

4.5 *Polygon mapping*: The task of fixing the position of the boundary of the suspected hazard area. The boundary is recorded as a polygon, typically on a topographic map, an orthophoto, or on a sheet of paper as a set of points projected by compass bearing and estimated distance from the safe viewing point or by the use of GPS. Polygon mapping must never compromise safety in order to improve the boundary description.

4.6 *Turning point*: “a fixed point on the ground which indicates a change in direction of the perimeter of the hazardous area” [IMAS 04.10, 2nd Edition (2003-01-01) #3.216]

4.7 *GPS*: Global Positioning System; Satellite-based geographic location technology.

4.8 *Field Mapping Teams*: Groups of individuals specialized in polygon and linear mapping contracted by the LIS and reporting to the Survey Group Supervisor.

5.0 Instructions

5.1 Training

5.1.1 SAC and HQ staff will train interviewers in the safe and efficient execution of the visual inspection procedure. This should include skills for determining the position of mined sites or sites with UXO, map orientation, locating features on a map, plotting GPS points, and measuring or estimating direction and distance to remote features. Interviewers should be trained in collecting terrain data – such as ground cover, soil type, terrain type, and topographical features – consistent with IMSMA data requirements. There should be exercises on the usage of GPS and maps to fix the safe viewing points and to determine the distance and bearing to the starting point and turning points of the SHA. The interviewers should be trained to do sketch maps of the SHA in the field. **[ref. 6.1, P03 – Data Requirements]**

5.1.2 SAC and HQ staff will instruct interviewers to assess the safety of a particular safe viewing point and decide on the basis of that assessment whether to conduct the

inspection. The assessment will be based on safety concerns. SAC and HQ staff will train interviewers on the safe conduct of the activity, and will also provide mine awareness training, in order to assure the safety of the interviewers as well as the safety of key informants and the community in general.

5.2 Alternatives

5.2.1 Interviewers will not conduct visual inspection if there is no safe viewing point. This decision shall be at the discretion of the Team Leader of the interviewers.

5.2.2 If the SHA is a significant distance away from the community, interviewers will decide whether visual inspection is feasible, given time constraints and the overriding priority of the group interview. The implementing partner shall publish a Standard Operating Procedure [SOP] to provide instruction to interviewer teams on the conditions that must be met to determine that a SHA cannot be visited.

5.2.3 If visual inspection is not possible, interviewers will note the direction and distance to the suspected hazard area from the community centre or suitable safe viewing point.

5.2.4 Interviewers should determine whether map-literate key informants are available to show the location and extent of the SHA and thus provide some of the required data without doing the visual inspection.

5.3 Approaching a suspected hazard area

5.3.1 When possible the interviewers should select two local guides. This will enable the cross referencing of two sources of information. Guides should be recommended by the community leader, have a good knowledge of the area, and always be a member of the interview group. The guide(s) will receive a safety briefing making it clear that the group does not want to enter the suspected hazard area and that they do not need to see any individual mines or UXO. The guides should be clearly instructed that once on the ground if they become doubtful of the exact location of the SHA they should inform the interviewers immediately. Only the guide(s) should accompany the interviewers to verify the suspected hazard areas. Children or other persons not directly involved in the process should not accompany the interviewers during the visual inspection.

5.3.2 The group will only travel along well-used paths or roads. The group must not go through brush. No one in the group will pick up, touch or throw any object. Interviewers should stop if they feel uncomfortable about accessing any suggested safe viewing points. By regularly questioning the guide(s) interviewers should continually reconfirm their distance from, and location of the SHA and monitor the proficiency and knowledge of their guide(s).

5.3.3 In discussion with the guide and / or the community leaders, interviewers will select a safe viewing point that allows observation of the danger site. This should be a position that is often used and is known to be safe. This point should ideally be a

conspicuous feature, a fixed and easily recognizable landmark in the terrain that could later be used as a benchmark by any subsequent marking and clearance operations. If the safe viewing point is without distinguishing features the interviewer shall endeavor to take a GPS reading, a back bearing and record the distance to a fixed safe viewing point in the area. The **safe** viewing point may not provide the **best** viewing point but safety is the prime and overriding criterion. Appropriate sites for the safe viewing point might be from the inside or on the roof of a safe building/vehicle, a tarred road or a well trafficked dirt road/track.

5.3.4 Interviewers will remain in control of the group at all times. Interviewers will remain together and must not conduct two separate inspections simultaneously. The group should use standard behavior for walking near areas with mines/UXO e.g. walking single file, not less than 5 meters apart at all times, etc.

5.4 Visual inspection procedure

5.4.1 The interviewer will take a GPS reading of the safe viewing point and estimate the extent of the SHA. These data are entered in the questionnaire. Interviewers will draw a sketch map of the SHA in the relevant portion of the questionnaire, marking the nearest starting point at the closest side of the SHA, and its distance and bearing from the safe viewing point. Interviewers should mark all relevant landmarks.

5.4.2 It may happen that the visual inspection causes the interviewer to doubt the information provided on the SHA during the group interview. The visual inspection is a tool for refining SHA information on the SHA and for clarifying misunderstandings that may have occurred during the group interview. If the visual inspection identifies mistakes that are caused by misunderstandings, the interviewer will make corrections in the SHA module of the questionnaire, and duly describe and justify the correction.

5.4.3 Where the visual inspection causes the interviewer to doubt the existence of a hazard in the SHA reported by the community or the interviewer determines that there is a SHA and the community does not concur, the interviewers must discuss these discrepancies with the community leader, and then with the field supervisor. If SHA was reported in the interview by mistake or due to a misunderstanding the SHA should not be recorded. For instance they might observe animals were grazing on the land or evidence of fresh cultivation. However, if villagers or others make a justified claim that the area be suspected of mines or UXO, it must be recorded as a SHA. The community leader should be consulted because the interviewers may have been led to the wrong location or, on reflection, the community leader may confirm the interviewers' doubts. If so, the SHA would be removed from the data. A signed confirmation is required from the community leader. If the interviewer team and the community leader cannot reach agreement, the SHA shall be recorded in the normal manner with a user defined field in IMSMA to indicate that it is "in dispute".

5.4.4 A photographic record enhances the report and is recommended but in some cases may not be feasible. A photograph will be taken of each safe viewing point to aid

navigation on subsequent visits. Interviewers should take one or more photos to encompass the entire SHA from safe viewing points. Interviewers should only photograph visible mines or UXO if this is possible from a safe viewing point and if there are no security-related issues. Interviewers should set the digital camera to high resolution. Under no circumstances must interviewers enter the SHA or approach suspicious objects in order to acquire better photographs.

5.5 Polygon mapping procedure

5.5.1 All SHAs should be polygon mapped and include three components: 1) a list of GPS readings in a table, 2) a sketch map, and 3) the SHA marked as a feature on a topographic map.

5.5.2 The list of GPS readings should consist of map coordinates for the safe viewing point, the starting point and each turning point. Distance and bearing from one point to the other should also be provided. Each turning point in the list of GPS readings should be assigned a unique name. The list of GPS readings should always state the map projection and map datum used. See 8.2 for an example of such a list.

5.5.3 The sketch map should be a drawing of the SHA and relevant landmarks. The sketch map should include safe viewing points, the starting point and all named turning points. The sketch should contain a scale and orientation. The sketch map should include distances and bearing from the safe viewing points to the other points in the list of GPS readings. It should also include distances and bearing between the safe viewing point and the starting point, the starting point and the first turning point. Likewise it should consist of distance and bearing between all turning points and between the last turning point and the starting point.

5.5.4 Field Mapping Teams (FMT) will then record the SHA on a 1:100,000 or better topographical map. Physical and infrastructural features should be highlighted as these may define the boundaries of the SHA. Once the boundary of the SHA has been fully or partially fixed by these features and / or by the distance and bearing of turning points, the enclosed area should be expressed as a polygon and used for more accurate size estimation than in the original visual inspection conducted by the interviewers. The teams should also map linear SHAs, such as roads, power lines or riverbanks, using the same boundary technique. If the SHA is too small to be recorded as a polygon on the available topographic map in a meaningful way, one can choose to map the SHA as a reference point

5.5.5 The survey HQ will return the polygon map constructed using GPS readings together with a copy of the sketch map and the topographic map. The SG supervisor will then assure quality of the GPS readings, the sketch map and the topographic map feature before returning it to survey HQ

5.5.6 Defining and mapping polygons requires special skills and training. Either specially trained FMTs are developed to carry out this task, or the interviewer teams are

provided the required training. The interview team should carry out the visual inspection. If they are trained in polygon mapping they do so, otherwise they note those areas that require follow-up mapping by FMTs. Operational requirements will largely dictate whether the polygon mapping should be done by special FMTs or by the interviewer teams. In either case a special training curriculum on polygon mapping based on this protocol must be developed and used.

5.5.7 If FMT are deployed after the interviewer team has visited the community, the FMTs will study the visual inspection data gathered by the interviewer team during the community interview, and should discuss any omissions or further issues with community members. FMTs will spend as much time as necessary to complete their tasks before moving on to the next community.

5.6 SHA boundary and size estimates

5.6.1 Due to the methods used to identify SHAs they are typically recorded as larger than the actual contaminated area. A technical survey is able to define more accurately the area of contaminated ground.

5.6.2 Interviewer teams should assign the SHA to one of two classes: well-defined and poorly defined. A well-defined SHA is one where the interviewers clearly can see a clear boundary between the inside and outside of the SHA – along the entire boundary. The boundary may be visible between non-cultivated and cultivated land, thick vegetation and land that is being used, and land not in use and features such as rivers, lakes and paved roads. A poorly defined SHA is one where none or only some of the perimeter is well-defined. This may either be due to the absence of a visual expression of the boundary or due to uncertainty or precision in the information obtained from the key informant(s).

5.6.3 When drawn on sketch maps and topographic maps, the polygon line should clearly show which segments of the SHA boundary are well-defined (using a solid line) and which are poorly defined (using a dashed line). If the scale of the topographic map does not permit this, one should nevertheless indicate this on the sketch map.

5.6.4 If a reasonable boundary for a closed polygon cannot be drawn, this should be clearly stated by the FMT on the sketch map and the LIS survey questionnaire. A starting point and an estimate of the size of the area should be provided as an alternative.

5.6.5 SG supervisor and Survey HQ shall agree on using starting points and an estimate of area size as an alternative to a closed polygon with uncertain boundaries reported by a FMT.

6.0 Rationale / Background

6.1 The purpose of carrying out a visual inspection is to confirm the existence of the SHA, to cross-check information from the community group interview in order to eliminate misunderstandings or items of disinformation, to collect supplementary data on the SHA of use to later mine action operations, and to inform the public about the proximate boundaries of SHAs.

6.2 Visual inspection is carried out to all SHAs reported in the community group interview, unless the access to a safe viewing point is too far, too difficult or not safe. The visual inspection is an element in the information gathering and quality control processes.

6.3 Mapping of the SHA boundaries is one element of the visual inspection. It is carried out either by the interviewer teams during the visual inspection or by specially trained Field Mapping teams at selected SHAs on the recommendations of the interviewer teams and Survey Group Leader. Polygon mapping is done for the purpose of providing a detailed description of its extent to better prioritize and prepare methods for marking, reducing or eliminating the SHA. A number of organizations in many countries have practiced the polygon mapping and the visual inspection procedures as the key element of their emergency, general or systematic surveys.

6.4 When conducted in accordance with guidelines, SOP's, drills and procedures visual inspection is a safe activity. Training and experience combine to produce proficient operators. However, complacency can creep in. This is countered by quality management, processes and refresher training.

7.0 Materials

7.1 GPS receiver (required)

7.2 Compass (required)

7.3 Binoculars (recommended)

7.4 Laser range finder (recommended for interviewer teams, required for FMTs)

7.5 Digital camera (recommended)

7.6 Topographic maps (recommended)

8.0 Attachments

[NB: These are documents from different surveys, reports or old protocols that have been attached to this protocol in case they are found useful, interesting or relevant. They are purely optional reading.]

8.1 Guidelines for topographical mapping, by Aldo Benini and Rune Engeset

8.2 List of GPS readings

From	To (GPS reading)	Distance	Bearing	X	Y	Datum	Projection
	Safe viewing point	20	20	15°14'18 E	12°47'08 S	WGS 84	Geographic
Safe viewing point 1	Starting point	20	140	15°14'20 E	12°47'10 S	WGS 84	Geographic
Safe viewing point 1	Point 1	50	45	15°14'25 E	12°47'05 S	WGS 84	Geographic
Safe viewing point 2	Point 2	20	90	15°14'27 E	12°47'09 S	WGS 84	Geographic

9.0 Related Protocols and Advisories

9.1 P05 – Guidelines for interviewers

9.2 P04 – Field Organization

9.3 P03 – Data Requirements and the Questionnaire

10.0 References

10.1 P06: Visual verification is covered under objective 2.3 and output 8 on the generic timeline.

11.0 Revisions

11.1 Written by Aldo Benini, 00 12 01

11.2 Reformatted and edited by Dann Naseemullah, 02 12 05

11.3 Drafted by Rune Engeset and SAC staff, 04 02 01

11.4 Revised by SAC and SWG staff, 04 11 11

Attachments

1. Guidelines for topographic maps and SHA polygons (compiled from contributions by Aldo Benini, Rune Engeset, and Tom Haythornthwaite)

Precautions

The standard procedure will be to sketch suspected hazard areas (SHAs) as polygons on topographic maps. However, the survey must weigh the value-added of this activity against extra costs in terms of time and training. During the project planning phase (typically the ASM), the feasibility of the activity should be considered. It may be discarded for all or parts of the survey area if the answer to any of the following questions is negative: 1. Are appropriate topographic maps available for the area of survey operations? 2. May appropriate training be successfully completed? Limiting factors are training skills and survey team candidate capacity. 3. Is it logistically possible and safe to bring maps into the field, and is it possible to reproduce or copy maps for use by the survey teams with the required coverage as the survey teams visit community by community and region by region? 4. Is there or will it in the near future be a request for this type of data from survey stakeholders in the country?

Polygon mapping on topographic maps does not alter the community mapping component of the community interview. Key informants need to carry out the community mapping on a blank sheet of paper and not on a topographical map, to prevent introducing preconceived notions to the mapping exercise.

After these factors are taken into account, the use of topographic maps can have considerable benefits, for the field teams as well as future technical surveys.

Guidelines

Updating the map

Before visiting the community, the topographic map should be studied. A photocopy of an appropriate scaled topographic map over the community area should be made. Before the community interview, interviewers should update and mark as follows; the suggested color key may be changed to meet local conditions):

- Update key features using a pen, such as the international border (black pen), community location and names (black pen), community borders (black pen) and roads (black pen). Mark rivers, canals and lakes (blue pen)
- Highlight key features using a highlighter, such as the international border (blue highlighter), communities (yellow highlighter), community borders (yellow highlighter) and roads (green highlighter)

Update the photocopy of the topographic map *during the visual inspection* of each SHA according to the following rules:

- Mark the community reference point (blue pen) if possible without constricting the scale and identify it as CRP

- Mark the Safe Viewing Point (blue pen). The Safe Viewing Point of SHA 1 should be identified as SVP1
- Mark clearly the boundary of the suspected area (red pen). If part of the SHA boundary cannot be well defined, the approximate position of this line is dashed (red pen). The SHA referred to as #1 in the SHA module should be clearly identified as SHA1.
- Mark accident sites (red pen) and reported mines/UXO (red pen) if possible
- Mark all accessible roads (green highlighter)

When completed for all SHAs, interviewers should attach the topographic map to the community module.

A detailed sketch map should be drawn of the SHAs if:

- The SHAs are not possible to delineate or separate on the topographic map, or
- The sketch map would provide valuable extra information without requiring too much time to complete

Georeferencing SHAs

The procedure for fixing the position of a suspect area onto a map will depend to some extent on the functions available on the GPS being used, the degree of access to the suspect area and the level of mapping skills of the interviewers.

Suspect areas such as buildings, roads, railways, power lines, canals, and riverbanks that are indicated on the map can be easily highlighted. These areas identified on the topographic map can be digitized later and displayed in the GIS.

If the boundaries of the SHA can be readily identified or inferred by a combination of good informants and/or delineation due to cultivation, abrupt topographic variation, international borders, watercourses or lakes and artificial features such as roads, interviewers should plot the area on the topographic map.

If the definition of the extent of the SHA is poor, the mapping staff should fix a SHA starting point and attempt to estimate the area.

Locating non-verified areas on topographic maps

Suspected sites not visited should be located if possible using the direction and distance obtained during the community interview and through follow-up discussions with the topographic map.

Checking by Field Editors

It is important for Field Editors to check interviewer mapping and GPS fixes.

Recording the information in IMSMA

SHA polygons are recorded in the minefield section of IMSMA.