

# **DEMINING NATIONAL STANDARD 09.20**

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## **Sampling procedures for the inspection of cleared land in Mozambique**

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## Introduction

The target of humanitarian demining is the identification and removal or destruction of all mine and UXO hazards from a specified area to a specified depth. The objective of this standard is to promote a culture where the demining community strives to achieve this target by developing and applying appropriate management procedures, by establishing and continuously improving the skills of managers and deminers, and by using safer, more effective and more efficient equipment.

The beneficiaries of humanitarian demining programmes must be confident that cleared land is safe for their use. This requires management systems and operational procedures which demonstrate the very highest levels of quality.

NS 09.20 specifies clearance quality by adopting a two-stage approach. Stage 1 (quality assurance) involves the establishment and monitoring of quality management systems and operational procedures before and during the clearance process. Stage 2 (quality control) involves the inspection of cleared land by sampling. The inspection of cleared land provides confidence that the clearance requirements have been met, and as such forms an essential part of the overall clearance process.

General principles and procedures for inspection and sampling have been developed by the International Agency for Standardization (ISO), and these approved principles and procedures are published in ISO 2859-0. The ISO inspection and sampling procedures provide rules which enable decisions to be taken on the quality of a product - in the case of demining the 'product' is cleared land.

The results of sampling are greatly influenced by the way in which a sample is selected. Rigorous procedures for sampling are therefore required. If procedures are not established and are not followed, then the inspections could be influenced by personal opinion and bias, which would undermine the results - and in the case of demining will reduce confidence that the land is safe for its intended use. This NS establishes the procedures and rules for the sampling of cleared land in accordance with the general principles given in ISO 2859-0 and IMAS 09.20 and explain how they will apply in Mozambique.

## **Sampling procedures for the inspection of cleared land**

### **1. Scope**

This NS establishes a system for inspecting the quality of land clearance by the application of sampling before acceptance. It defines terms, establishes a management system and procedures, and provides guidance on the implementation of these procedures.

This standard is applicable to mine and UXO clearance tasks which have been conducted in accordance with the requirements of NS 09.10.

### **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 and definitions**

A list of terms and definitions used in this standard is given in Annex B. The terms and definitions in this NS are in compliance with IMAS 04.10 (Glossary of mine action terms and abbreviations) and all terms that have been developed locally have been captured in NS 04.10 (Glossary of mine action terms and abbreviations in Mozambique).

The term 'national mine action authority or authorities' which usually refers to the government department(s), agency(s) or institution(s) in each mine-affected country charged with the regulation, management and co-ordination of mine action is used, in Mozambique IND has been designated to fulfill these responsibilities with regard to the supervision and implementation of demining operations.

The term 'demining agency' refers to any agency (government, NGO or commercial entity) responsible for implementing demining projects or tasks. Demining agencies include headquarters and support elements, and comprise one or more sub-units. Demining agencies in the NS refer to those agencies that are contracted and or accredited by IND to carry out demining activities in Mozambique. Demining agencies include headquarters and support elements, and comprise one or more sub-units (see below).

The term 'sub-unit' refers to a formed group of people, with equipment, supplies and other capabilities (such as mine detecting dogs), which apply approved procedures to carry out demining tasks such as survey, marking and clearance.

The term 'inspection body' refers to any agency, which conducts post-clearance quality control on behalf of the national mine action authority by applying random sampling procedures, or other appropriate and agreed methods of inspection. Inspections in Mozambique will be carried out either by IND or by one of the accredited demining agencies contracted to IND.

### **4. General requirements and principles**

The inspection of cleared land will be done by IND inspection bodies or those acting on behalf of IND. This inspection forms part of a management process which aims to verify the quality of clearance, and to establish sufficient confidence that the demining agency has removed and/or destroyed all mine and UXO hazards from the specified area to the specified depth, in accordance with its agreed contractual obligations and or the demining agency annual works plan.

The minimum total area of land to be inspected after clearance shall be calculated using figures derived from ISO 2859-0, of which an extract is at Annex C. The individual units of land to be inspected in Mozambique shall be chosen by the inspection body at **random**.

The effectiveness and validity of inspection by sampling requires the clearance process to be 'continuous and under control'. A 'continuous' process implies that each lot presented for inspection (see Clause 5.2 below) shall include land, which has been cleared under similar conditions; i.e. by sub-units with similar capabilities, using similar operational procedures and with similar equipment.

## **5. Non Conformances and Inspections**

There are three types of non-conformances; Minor, Major and Critical. All non-conformances require follow up action otherwise the non-conformance will occur again because there has been no attempt to remedy the fault(s) identified. The procedure to prevent re-occurrence of a non-conformance is to conduct a preventative action.

The procedure for solving non-conformances is to firstly conduct remedial action which fixes the problem; secondly to conduct corrective action to trace the problem as to how far it has spread; and thirdly to conduct preventative reoccurrence.

A non-conformance is not restricted to a demining incident; it equally applies to logistical and administrative functions as well as operational functions. An example being an item of equipment that fails the pre-entry standard. If that item or procedure is permitted to be used then a non-conformance has occurred because the item was not inspected and or tested before use. It is not possible to list all examples of non-conformances.

### **5.1 Minor Non-conformance**

A minor non-conformance is the result of a failed investigation process. In other words a routine inspection was not conducted, or was not conducted to a sufficient standard, or sufficient frequency and the non-conformance resulted. Whilst the product did not 'fail' the issues needs remedial, corrective and preventative action to stop it reoccurring.

### **5.2 Major Non-conformance**

A major non-conformance is a deviation from any contractual agreement. An example being is a 'product' that did not achieve a pre-determined and agreed standard. This is a serious non-conformance and needs addressing, as it will affect the demining agencies future reputation as being able to deliver a 'product' to an acceptable standard. This may take the form of potential funding as an NGO or future commercial contracts being awarded to commercial operator.

### **5.3 Critical Non-conformance**

A critical non-conformance is a product that is unfit for use, and is declined by the client, IND, and or end user. An example is a 'failed' piece of land after sampling due to location of a mine/UXO, or an incident and or accident. Example: mine accidents are a compulsory declaration in the IND application for accreditation – desk assessment form therefore is an indicative factor in how a demining agency reforms it procedures after critical non-conformances.

### **5.4 Categories of Inspections**

The category or frequency that a demining agency conducts inspections is guided by the following criteria:

- If the non-conformance causes major operational problems then each item requires inspection or verification.

- If the non-conformance causes minor problems then a sampling system needs to be implemented.
- If the non-conformance causes no problems then the quality check and occasional quality check needs to be implemented.

## 6. Sampling plan

### 6.1. Cleared area

The area to be cleared and the depth of clearance should be determined in advance by a technical survey, or from other reliable information which establishes the extent of the mine and UXO hazard area, and should normally be defined in the annual work plan for NGO's and or contract specification for commercial contracts. If the depth of clearance is not specified the default depth shall be 13cm. (Clearance requirements are covered in detail in NS 09.10.)

### 6.2. Area to be inspected

The cleared area may be divided up for inspection into one or more 'lots' of land. The size of each lot will depend on many factors, including the total mined area to be cleared, and whether the area consists of a single large minefield or a series of small mined areas.

### 6.3. Sample size

The sample size (i.e. the area of land to be inspected in each lot) depends on four factors:

- a) the lot size. (See Clause 5.3.1 below)
- b) the intended use of the land. (See Clause 5.3.2 below)
- c) the experience and effectiveness of the demining agency. (See Clause 5.3.3 below)
- d) the sampling methodology. (See Clause 5.4 below)

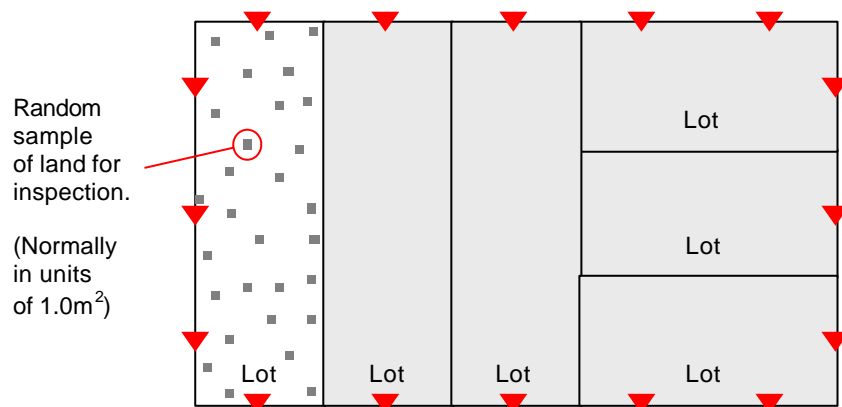


Figure 1: Illustration of cleared area, lots and samples of land for inspection

#### 6.3.1. Lot size

As stated in Clause 5.2 above, the required sample size is not directly proportional to the lot size. Refer to IMAS 09.20 for a detailed explanation on this aspect. For ease of application, the relationship between the sample size and lot size is summarized in the table in Annex C. It can be seen that a smaller lot size requires a proportionally larger sample.

### **6.3.2. Land use**

The sample size may be increased if additional confidence is needed on the quality of clearance. This will depend on the use to which the land is to be put, and the amount of human and animal traffic it will receive. Three levels of land use (LU1, LU2 and LU3) are provided to represent the required confidence levels. If no level is specified, the highest confidence level, LU1, shall be applied. In Mozambique land will be categorized as follows:

- a) Land Use 1 (LU1). These are areas that require a higher level of confidence and are areas such as tracks and footpaths, and areas around wells, housing and schools.
- b) Land Use 2 (LU2). Agricultural and grazing land.
- c) Land Use 3 (LU3). These are typically areas of land of little agricultural use and poorly frequented such areas on top of high terrain.

A Specific Quality Limit (SQL) will be applied to provide an indication of the quality required of clearance operations. For acceptance sampling purposes, the SQL indicates the borderline between what can be considered reasonable over time. It has to be attainable by the demining agency, but tolerable to IND – representing the interests of individuals and communities who will make use of the cleared land.

In the case of mine clearance, the SQL reflects the average contamination (in terms of non-conforming items per square metre) following a lengthy and steady process run. The table in Annex C has been produced assuming a nominal SQL of 0.35% for cleared land.

### **6.3.3. Inspection levels**

The sampling procedures established in ISO 2859-0 and IMAS 09.20 for the inspection of critical non-conformities include four levels of inspection. The inspection levels reflect the proven effectiveness and capabilities of the demining agency. Refer to Annex E for an example of sampling in practice. They provide an incentive to improve performance. For the inspection of cleared land:

- a) the 'normal' level of inspection defines the average size of sample, which will achieve sufficient confidence that the demining agency has removed and/or destroyed all mine and UXO hazards from the specified area to the specified depth.
- b) the 'tightened' level of inspection shall be applied at the start of a contract and at the start of each clearance task when the demining agency has yet to establish a record of effective and efficient clearance. The 'tightened' level may also be applied to a successful demining agency on the introduction of new and unproven operational procedures or new and unproven equipment.
- c) the 'reduced' level of inspection gives credit to successful agencies with a proven record of safety and effective clearance.
- d) 'skip inspections' can be applied to demining agencies that have a consistent record of safe and effective clearance.

The switching procedures and rules, which enable demining agencies to move between different levels of inspection, are described in Annex D. IND shall not modify the switching procedures.

### **6.4. Sampling scheme**

The individual units of land to be inspected (normally in units of 1.0m<sup>2</sup>) shall be chosen in a random fashion. IND will not deviate by applying assumptions and other judgments to select land to be inspected.

Sampling units of 1.0m<sup>2</sup> may be grouped into clusters for ease of inspection. All units inside each cluster shall be inspected. For the application of this IMAS, clusters shall be no larger than 30 m<sup>2</sup> in size. Clusters may be of any shape including, for example a circle, a square or a strip, but they shall be the same size in any single lot of land presented for inspection.

Small areas of land may be grouped into a single lot, and submitted as a single lot for inspection – so long as all the areas have been cleared by the same demining agency under similar conditions (see Clause 4 above). All areas, regardless of size, shall be inspected – the sampling effort shall be in proportion to the size of each area. This process is known as 'stratification'.

*Example: A demining agency has been contracted to clear four plots of land in the same area (three are 1,000 m<sup>2</sup> and one is 2,000 m<sup>2</sup>). The agency has been authorized to group the plots as a single lot and to submit that lot for inspection. The inspection body should stratify the sample by allocating 40% of the sampling effort to the bigger plot and 20% to each of the three smaller plots.*

### **6.5. Method of inspection(s)**

The procedures and equipment used by the inspection body to inspect the samples of cleared land shall be approved by IND, and agreed with the clearance agency as part of the work plan or contract. The primary sampling tool IND will employ is MDD with the secondary tool being metal detectors. MAMC machinery may be used if required. In areas where mineralized soil prevents the use of IND issued metal detectors, then the sampling plan shall be amended to use either, the demining agency metal detectors of the same type and model(s) used to clear the land, excavation (trenching), or sampling MDD as an alternative. (See NS 07.40 paragraph 5.2.7 for loan of such equipment). Vegetation cutting may be required from time to time, and this can be done manually or mechanically.

### **6.6 Acceptance criteria**

A 'lot' shall be considered as 'cleared' only if all the samples in the lot are found to be free of mines or UXO down to the depth specified for the task. Where any sample in the lot is found to contain one or more mines or UXO, this will constitute a 'critical' non-conformance, and the lot containing that sample shall be declared to have failed the inspection.

Cleared land may contain other indicators of potential non-conformity, such as residual metal fragments following detection by metal detectors, or residual traces of un-burnt explosives following detection by MDD and or explosives detectors. Such cases would indicate a potential critical failure of the demining process (equipment, people or procedures), and again constitute a critical non-conformity. The conditions for acceptance or non-acceptance of all categories of non-conformity shall be determined by IND. Commercial agencies should clarify with IND the acceptance criteria before commencement of a new contract. See glossary in this NS for the meaning of mine/UXO debris and hazardous mine/UXO debris.

#### **6.6.1 Acceptance criteria for metal detector sampling**

All mine/UXO debris and hazardous mine/UXO debris shall be removed to provide the land end user confidence that the area is indeed mine and UXO free. The presence of 25g or more of scrap ferrous metal found in any 1.0 m<sup>2</sup> unit of land offered for inspection shall be a considered as non-conforming. The identification of three or more separate sample units, in a single lot, each found to contain 25g or more of scrap metal shall be considered as a 'critical non-conformity'. In these circumstances the lot shall be rejected."

#### **6.6.2 Acceptance criteria for MDD sampling**

All hazardous mine/UXO debris shall be removed to provide the land end user confidence that the area is indeed mine and UXO free. Any mine/UXO debris that is determined to have explosive vapor content shall constitute a non-conformance. (The only exclusion are electric

and non-electric detonators because they have a different chemical composition to explosives and have been proven to be difficult for MDD to detect). The identification of three or more 1.0m<sup>2</sup> units of land offered for inspection, in a single lot, each found to contain a mine and or UXO, or part thereof, with explosive vapor content shall be considered a critical non-conformity. In these circumstances the lot shall be rejected."

### **6.6.3 Acceptance criteria for Mechanically Assisted Mine Clearance (MAMC) machines**

The ground offered for sampling after MAMC have processed the land shall be Quality Checked (QC) by another demining asset, either MDD, metal detectors, sifting process or some alternative process, before the ground is offered for sampling. If the soil is removed from a site to another location then that soil shall undergo a QC process before being offered for sampling. All mine and or UXO debris shall be removed to provide the land end user confidence that the area is indeed mine and UXO free. The following constitute a non-conformance for a mechanical MAMC;

- a. Any area not covered by the MAMC that has been omitted by an alternative QC asset shall be considered a critical non-conformance
- b. The number of passes and or process shall be clearly identified in the task documentation/contract specification and failure to conduct the minimum required number of passes/process shall constitute a critical non-conformance.
- c. The presence of a mine and or UXO shall constitute a critical non-conformance once the lot has been offered for sampling.
- d. The presence of mine debris shall constitute a non-conformance. The presence of three items of debris in a single inspection lot shall constitute a critical non-conformance.

In these circumstances the lot shall be rejected."

### **6.7 Corrective action**

IND shall determine the corrective action to be taken on lots that are rejected. Guidance on corrective action should be provided by IND and shall be based on the NS, and or any relevant clause the demining agency's contract or works plan.

All non-conformities shall be reported to the IND, Department of Operations (DOP) in Maputo, through the QA agency and or the regional IND offices. Minor non-conformances should be dealt with at regional and or DOP level. Major and critical non-conformances shall be referred to the DOP where they shall notify the Director and Deputy Director. All major and critical non-conformities shall be investigated by IND. The demining agency shall provide the inspection body with reasons for each critical non-conformity, and shall provide a program of corrective action. If a lot fails re-inspection following corrective action, the inspection body may require the lot to be cleared again using a different sub-unit using different operational procedures and with different equipment, if these alternate methods exist.

If no acceptable reason is given for a critical non-conformity, either by the clearance agency or by the inspection body, the inspection body shall require the lot to be temporarily or permanently demarcated (Refer NS 08.40) depending on the expected timeframe for the non-conformity can be established and resolved. The cost of the demarcation materials shall be borne by the demining agency. IND is the final determining authority on corrective action.

### **6.8 Re-inspection**

Lots shall not be offered for re-inspection until the demining agency has taken corrective action as agreed with the inspection body in accordance with Mozambique NS.

The inspection body shall specify whether normal or tightened inspection (see Clause 5.3.3 above) shall be used for re-inspection. This shall be decided by IND DOP.

## **6.9 Record of inspections and results**

The sample plan, the methods used for inspection, and the results shall be recorded by the inspection body, including the location, depth, types of hazard and other non-conformities specified in the contract such as metal fragments or explosive residue. Details of all corrective action shall also be recorded. All records shall be forwarded to IND by the clearance agency concerned.

## **7 Responsibilities and obligations**

### **7.1 IND**

IND in its capacity as the national mine action authority shall:

- a) monitor the effectiveness of the sampling procedures, including the suitability of the Specified Quality Limit (which is currently set at 0.35%), and propose changes to UNMAS to change the SQL if required;
- b) specify the area to be cleared and depth of clearance in contracts and or work plans issued to demining agencies;
- c) specify criteria for applying levels of land use (LU1, LU2 and LU3) to demining agencies;
- d) specify categories of critical non-conformities other than mine and UXO hazards.
- e) provide guidance on any specific corrective action to be taken by demining agencies, (in addition to re-clearing the failed area), following an inspection which finds a critical non-conformity;
- f) specify the standards to be applied for the documentation of inspections, results and corrective action
- g) maintain the documentation for all inspected land; and
- h) establish an inspection body as part of the national mine action authority, or accredit an agency to perform the duties of an inspection body.

### **7.2 Inspection body**

The inspection body shall:

- a) gain accreditation to operate as an inspection body.
- b) apply the national NS standard and standards specified in a contract for the inspection of clearance tasks; and
- c) maintain and make available documentation including the sampling plan, methods of inspection and the results of inspections as specified by the national mine action authority.

### **7.3 Demining agency**

The agency undertaking clearance shall:

- a) gain accreditation and the licenses needed to operate as a clearance agency;
- b) apply the NS standards for clearance and inspection of clearance standards. In addition standards specified in the agencies contract shall be applied. IND is the final determining authority in regard clearance specification;
- c) investigate every critical non-conformity, provide the inspection body with reasons for every critical non-conformity, and provide a programme of corrective action; and

- d) maintain and make available documentation of clearance and, if necessary, re-clearance as specified by the national mine action authority.

## **Annex A (Normative) References**

The following documents when referred to in the text of this standard, form part of the provisions of this standard:

- a) ISO 2859-0:1995. Sampling procedures for inspection by attributes - Part 0. Introduction to the BS 6001 attribute sampling system
- b) ISO 2859-1: 1989. Sampling procedures for inspection by attributes - Part 1. Specification for sampling plans indexed by acceptable quality level (AQL) for lot by lot inspection
- c) ISO/IEC Compendium – Conformity assessment – Guides and Standards, 4<sup>th</sup> Edition
- d) IMAS 09.20 Sampling

The latest version/edition of these references should be used. IND, Maputo holds copies of all references used in this NS. A register of the latest version/edition of the NS and references is maintained by IND, Maputo, and can be found at the Operations Department in IND. Demining agencies should obtain copies before commencing demining activities in Mozambique.

## **Annex B** (Informative) **Terms and definitions**

### **1.1. Specified Quality Limit (SQL)**

an indication of the quality required from clearance operations. For acceptance sampling purposes, the SQL is a specified borderline between what can be considered reasonable as a process average and what can not. It has to be attainable by the producer (demining agency) but tolerable to the consumer (national mine action authority or contracting agency). The SQL reflects the average contamination (in terms of non-conforming items per square metre) following a lengthy and steady clearance operation. The table in Annex C has been produced assuming a nominal SQL of 0.35% for cleared land.

Note: The SQL shall be regularly reviewed by UNMAS as part of the standards review.

### **1.2. demining agency**

an organization working in Mozambique, either commercial, military, or NGO, whom is tasked and or contracted by IND. Demining agencies include headquarters and support elements, and comprise one or more sub-units.

### **1.3 hazardous mine/UXO debris**

a part of a mine or UXO that is potentially hazardous that does contain an actuating mechanism or part thereof and or explosive compound or part thereof.

### **1.4 inspection**

the process of measuring, examining testing or otherwise comparing a sample of cleared land with the clearance requirements

### **1.5 inspection body**

any agency which conducts post-clearance inspection(s) on behalf of the national mine action authority by applying random sampling procedures, or other appropriate and agreed methods of inspection.

### **1.6 lot size**

an area (comprising a number of 1.0m<sup>2</sup> units of cleared land) offered for inspection.

### **1.7 mine/UXO debris**

a part of a mine or UXO that does not contain an actuating mechanism or part thereof and or explosive compound or part thereof.

### **1.8 national mine action authority**

the government department(s), agency(s) or institution(s) in each mine-affected country charged with the regulation, management and co-ordination of mine action. In Mozambique IND is the 'national mine action authority'.

### **1.9 non-conformity**

the failure of a 1.0m<sup>2</sup> unit of land during inspection to meet the stated clearance requirements. IMAS identifies two types of critical non-conformities:

- a) the discovery of a mine or UXO; and
- b) other critical non conformities.

### **1.10 sample**

one or more 1.0m<sup>2</sup> units of land drawn at random from a lot.

### **1.11 sample size**

the number of 1.0m<sup>2</sup> units of land in the sample.

**1.12 sampling plan**

a specific plan that indicates the number of 1.0m<sup>2</sup> units of land from each lot which are to be inspected (sample size or series of sample sizes) and the associated criteria for determining the acceptability of the lot (acceptance and rejection numbers).

**1.13 sub-unit**

a formed group of people, equipment, supplies and other capabilities (such as mine detecting dogs) which apply approved procedures to carry out demining tasks such as survey, marking and clearance.

## Annex C (Normative)

### Required sample sizes for post clearance inspection

Cleared Area (m <sup>2</sup> )	Land Use	Inspection Levels		
		<i>Reduced</i> (m <sup>2</sup> )	<i>Normal</i> (m <sup>2</sup> )	<i>Tightened</i> (m <sup>2</sup> )
0 – 500	LU 1	295	335	410
	LU 2	230	250	280
	LU 3	145	200	220
501 – 1,500	LU 1	480	575	785
	LU 2	350	395	450
	LU 3	210	300	335
1,501 – 3,000	LU 1	570	690	990
	LU 2	405	460	525
	LU 3	240	345	385
3,001 – 5,000	LU 1	610	750	1,100
	LU 2	430	490	565
	LU 3	250	365	405
5,001 – 8,000	LU 1	640	785	1,175
	LU 2	445	510	590
	LU 3	260	375	420
8,001 – 15,000	LU 1	660	820	1,235
	LU 2	460	525	610
	LU 3	265	385	435
15,001 – 40,000	LU 1	680	840	1,285
	LU 2	470	535	625
	LU 3	270	395	440
40,001 – 200,000	LU 1	685	855	1,310
	LU 2	475	540	630
	LU 3	270	395	445

Figure C1: Required sample size (derived from ISO 2859-0 using the equation at Clause 4 of Annex E)

**Notes.**

(1) The inspection levels reflect the proven effectiveness and capabilities of the demining agency. They provide an incentive to improve performance. Switching rules which enable demining agencies to move between different inspection levels are provided in Annex D.

(2) LU1 refers to the most sensitive category of land and LU3 to the least sensitive. The required level of land use shall be decided by IND in accordance with national policy, and should be included in the contract/works plan.

(3) The sample size represents the number of individual one square metre units of land that need to be inspected.

## Annex D (Normative) Switching procedures

### 1. General requirements

Switching procedures shall be applied to the inspection of a series of lots offered for inspection. Selection of an inspection plan should include consideration of the lots offered for inspection and the application of the qualifications and experience of staff and the successful application of an acceptable quality management system. The flow chart in Figure D1 shows the application of switching procedures to a demining sub-unit.

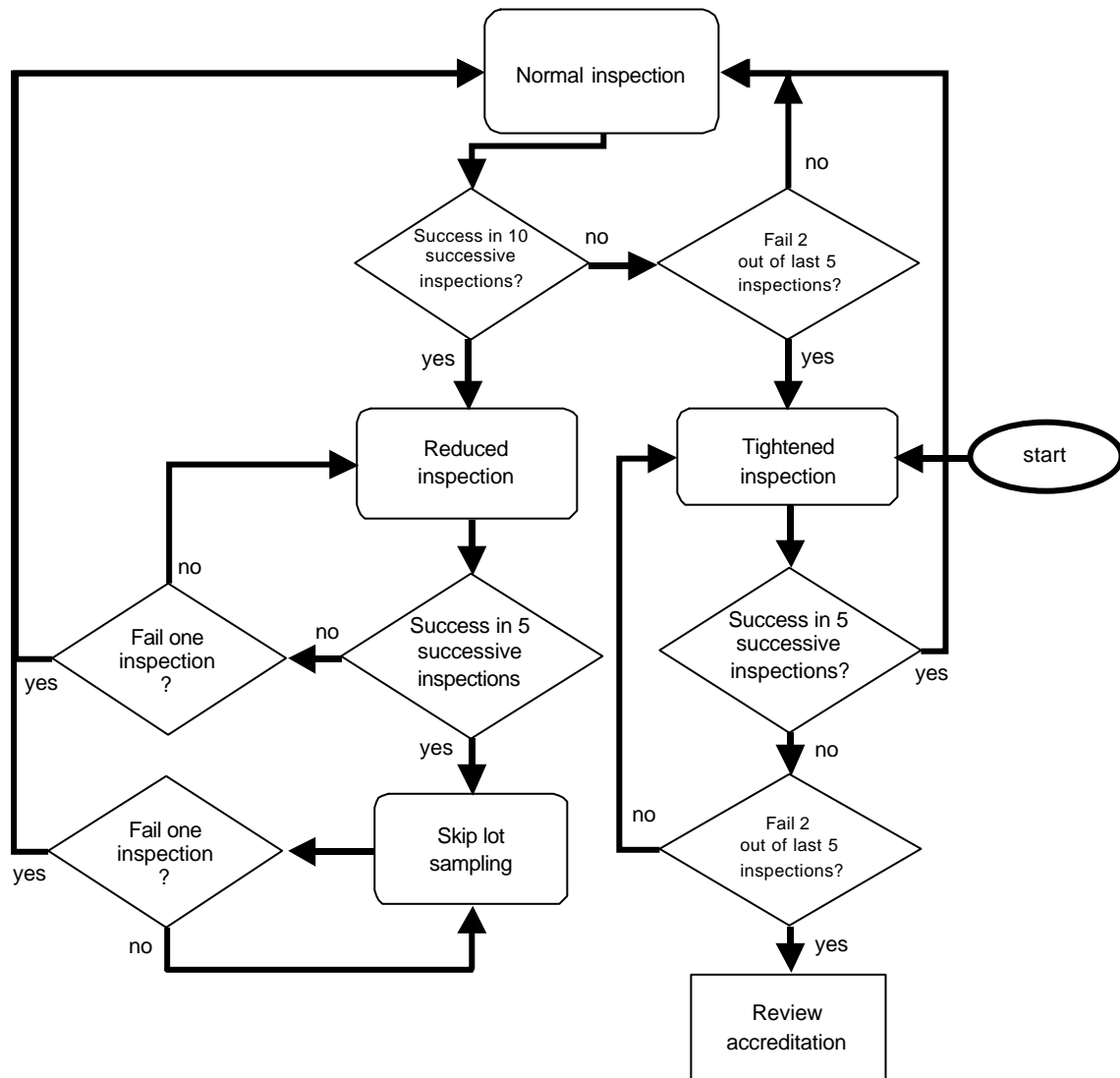


Figure D1: Flow chart of switching rules

## **2. Guidelines for switching between inspection levels**

### **2.1 General principles**

Tightened inspection levels shall be carried out at the start of the inspection process, or when inspecting the first lot of cleared land in any contract or agreement, unless otherwise specified by IND. Tightened, normal, reduced or skip-lot inspection shall continue on successive lots, except where the switching procedures require change in accordance with the following criteria.

### **2.2 Normal to tightened level**

When two of the last five or less consecutive lots failed to meet the clearance criteria, and have required corrective action.

### **2.3 Tightened to normal level**

When five consecutive lots have been presented for inspection and all have been accepted.

### **2.4 Normal to reduced level**

When the following considerations are satisfied:

- a) the preceding ten lots have been presented for normal inspection and all have been accepted; and.
- b) the clearance effort has been steady, there have been no long breaks or interruptions, and there have been no significant changes to operational procedures or equipment.

### **2.5 Reduced to normal level**

When any of the following occur:

- a) a single lot is not accepted and requires corrective action; or
- b) clearance becomes irregular or delayed due to bad weather or other external or internal factors; or
- c) other conditions warrant reversion to normal inspection, such a change in key staff (Team Leaders and Section Leaders), operational procedures or equipment..

### **2.6 Reduced to tightened level**

When an incident occurs which indicates a deviation from operational procedures or inadequate on-site supervision.

### **2.7 Reduced level to skip-lot sampling**

Skip lot sampling may be used when a series of lots has been regularly proven to be considerably better than the Specified Quality Level (see Clause 1 of Annex E). Skip lot sampling permits one in three lots to be chosen at random for inspection.

When reduced inspection is being carried out, skip-lot inspection may be put into operation provided that the following considerations are satisfied.

- a) the preceding five lots have been presented for reduced inspection and have all been accepted on original inspection;
- b) the clearance rate has been steady, there have been no long breaks or interruptions, and there have been no significant changes to operational procedures or equipment;
- c) the demining agency's management system is deemed to be acceptable; and

- d) skip-lot inspection is considered acceptable by the national mine action authority.

## **2.8 Skip-lot to normal level**

When any of the following occur on the original inspection:

- a) a lot is not accepted; or
- b) production becomes irregular or delayed; or
- c) other conditions warrant reversion to normal inspection, such a change in key staff, operational procedures or equipment, or when lots offered for inspection are not markedly better than the specified SQL. This criterion is applied to acceptance rules for 'other non-conformities'.

## Annex E (informative) Supplementary guidance on sampling

### Example of how sampling will be conducted in Mozambique

A lot presented for inspection has a total area of 7,000m<sup>2</sup>. It comprises grazing land which is deemed by IND to require the medium level of confidence (LU2). A demining agency with a proven track record is being used, and the contract has been in progress long enough for the agency to have gained the confidence of IND. This would allow a reduced sampling regime to be adopted (if these criteria are applied to the table above), a sample size of 445m<sup>2</sup> would, if proved clear, achieve sufficient confidence that the entire lot has been cleared and is safe.

Table 1: Required sample sizes for post clearance inspection

Cleared Area (m <sup>2</sup> )	Land Use	Reduced (m <sup>2</sup> )	Normal (m <sup>2</sup> )	Tightened (m <sup>2</sup> )
5,001 – 8,000	LU 1	640	785	1,175
	LU 2	445	510	590
	LU 3	260	375	420

The sample size may be increased if additional confidence is needed on the clearance quality for certain categories of land, for example tracks and footpaths, and areas around hospitals, medical clinics, schools and housing. Three levels (LU1, LU2 and LU3) are provided to produce this additional confidence. The required level of land use shall be decided by the IND in accordance with the national policy, and should be included in the contract. If no level is specified, LU1 shall be applied as default.

Table 2 below shows the confidence levels that have been used in producing this standard. Following the Reduced level of inspection in the example at LU 2 there is at least 81% confidence that the quality of clearance is better than the SQL.

Table E1: Confidence of clearance quality

Land Use	Reduced	Normal	Tightened
LU 1	91%	95%	99%
LU 2	81%	85%	89%
LU 3	71%	75%	79%

Using this information the inspection body would have to sample 445m<sup>2</sup> of the total cleared 7000m<sup>2</sup>. The 445m<sup>2</sup> (110 + 168 + 167) shall be chosen at random and could be laid out as follows:

