

ROAD/ROUTE SURVEY AND CLEARANCE

22.1 GENERAL INTRODUCTION

Following an initial assessment of the landmine problem in Sudan, it was revealed that mines were mainly used in the nuisance role. These mines are predominantly blocking access roads/routes to key areas and forcing the bulk of food/aid relief to be delivered by air. This presence of mines on key logistical roads/routes also continues to hamper other humanitarian interventions and endanger the local communities.

It is a fact that the majority of Roads/Routes in Sudan have yet to be surveyed. This creates significant challenges to Operations staff both at mission and agency level, and places significant security restrictions on travel. It is not possible to clear every cm of Road in Sudan, yet it is not possible to advise on the safety of roads in Sudan, without the conduct of an effective and systemised Road/Route Survey to establish the threat.

The road/route conditions in Sudan vary from good condition primary gravel roads/routes to tracks in a poor state of repair. The soil is usually very hard throughout the dry season (October to May); however in the wet season mobility can be limited due to the surface of the roads being too soft to bear the weight of the vehicle.

The purpose of this Road/Route Survey and Clearance Chapter is to define the minimum standards and procedures for Road/Route Survey and Clearance conducted in Sudan. This is not a stand alone document and is to be read in conjunction with NTSG Chapter 4 Mine/UXO Clearance, NTSG Chapter 8 Mechanical Mine Clearance, NTSG Chapter 9 Mine Detection Dogs and NTSG Chapter 17 Technical Survey. It is proposed that all works discussed in this Chapter will be conducted in accordance with approved and accredited SOP's of the organisation conducting the Road/Route Survey and Clearance.

22.2 ROUTE PHASES

The three distinct phases for the Survey and Clearance of roads/routes in Sudan are listed below, although the sequence may be altered to suite specific priorities:

- a. Phase 1 Road/Route Survey.
- b. Phase 2 Road/Route Clearance (8m and 25 wide).
- c. Phase 3 Road/Route Rehabilitation and Reconstruction.

Since it is usually different organisations involved in each phase or contract, full and detailed IMSMA documentation must to be handed over from one phase to the next through Regional UNMAO.

22.3 ROAD/ROUTE SURVEY PLANNING

During the planning phase of any Road/Route Survey all possible sources of information should be considered. Survey teams will provide the principal sources of information gathering from a multitude of sources. All possible credible sources of information should be explored and analyzed to determine its authenticity and accuracy to enable adequate planning to achieve the greatest results. Valuable information may also be obtained from 'technical' sources such as satellite images, aerial photographs, military dossiers and hospital records

22.4 ROAD/ROUTE SURVEY REQUIREMENTS

Organisations conducting Road/Route Survey in the Sudan should use a standard information collation form. As previously detailed it is essential to gather information from as diversified sources as possible, some sources of information that should be covered in the survey are:

- The local populous in the area who know the area.
- Knowledge of any previous mine UXO accidents / incidents along the route.
- Security threat in the area.
- History of conflict in the area.
- Previous vehicle use of the route.
- Weather / terrain – route conditions, obstacles.
- General intelligence in the area.

The standard information collation form (Road/Route Survey Questionnaire), is simple to utilise, maintain, and requires the minimum staff effort. Attachment No 1 to this NTSG Chapter details the Road/Route Survey Questionnaire that should be utilised for all Road/Route Survey Operations.

As an aid to its use, the Mined Area Indicators are divided into 1 km sections and 100 meter sub-sections. The listed information sources are not exhaustive

and should be expanded as and when required. In order to ensure that a sufficient quantity of credible data is made available a number of samples and resources should be acquired.

The authenticity and accuracy of survey data shall be determined by analyzing the **Type**, **Source** and **Details**. For example, each category is allocated a rating of accuracy (reliability) starting at one as the least accurate, through to five being the most accurate.

Survey information gathering should provide a source of continually updated data and not merely a 'single snap-shot' of the situation.

22.5 ASSESSMENT OF INFORMATION

By its nature the classification of routes into well defined categories requires specialist knowledge and experience. The assessment of information obtained from the road/route survey involves the detailed examination and cross referencing of each item of information with as many creditable sources as possible, an evaluation of these results and then the identification of significant facts of information concerning the road/route, leading ultimately to appropriate conclusions being made.

This Road/Route Survey requires specialist skills that may be initially in lacking in present in-country survey assets, therefore extensive training of Survey Teams who will be conducting the Road/Route Survey should always be conducted to ensure suitably qualified specialists. The objective of assessing information is to ensure an accurate threat assessment and classification in order to prevent avoidable accidents/incidents from occurring.

Following the Road/Route Survey and when all relevant information has been risk assessed and cross referenced with all possible creditable sources, routes will then be classified into the following categories:

- a. Not Surveyed - Annotated the colour GREY on UNMAO maps.
- b. No Evidence of Mines/UXO – Annotated the colour AMBER on UNMAO maps.
- c. Mined – Annotated the colour RED on UNMAO maps.
- d. Cleared – Annotated the colour GREEN on UNMAO maps.

This classification will allow Operation Managers to plan future clearance activities on or near the Roads/Routes where mined Roads/Routes or mined areas are identified and will allow mission and other agencies to include

appropriate safety and security measures in planning for movement of assets and personnel.

The “**Not Surveyed**” Category is further defined within the following parameters:

- No recognised Road/Route Survey has taken place along the route with regards completing the Road/Route Questionnaire and obtaining a comprehensive inventory on:
 - All reported and/or suspected locations of mine/UXO contamination.
 - The quantities and types of explosive hazards.
 - Information on the local soil characteristics, vegetation and climate.

Note

If insufficient information is collected during the conduct of the survey, to confidently categorise the road as “No evidence of Mines/UXO” then its category must remain “Not Surveyed”.

The “**No Evidence of Mines/UXO**” Category is further defined within the following parameters:

- A recognised Road/Route Survey has taken place along the road/route with regards completing the Road/Route Questionnaire and:
 - There is no information or suspicion of mines being laid or mine incidents / accidents on the road/route.
 - The road/route has been frequently used by local population and large vehicles without incidents / accidents.
 - The road/route is easily identifiable.
 - There is no information regarding any military activity or cross line fighting having taken place.
 - No defensive positions or ambush sites have been identified.

The “**Mined**” Category is further defined within the following parameters:

- A recognised Road/Route Survey has taken place along the road/route with regards completing the Road/Route Questionnaire and:

- Although the road/route is in use, there have been mine incidents / accidents in the past.
- There is information that mines were laid in the area and that there have been some mine incidents / accidents reported.
- There is information that hostilities took place in the area, although, no recorded mine incidents / accidents.
- There is reliable information that mines have been laid and their have been a number of recent mine incidents / accidents.
- There is credible information that the road/route has been mined.
- The local population believes the road/route to be mined but can not give details of specific incidents.

The “Cleared” Category is defined as

“A road/route that has been physically and systematically processed by a demining organisation to ensure the removal and/or destruction of all mine and UXO hazards to a specified depth in accordance with NTSG’s”.

Road/route classification is a continuous process which aims to accurately reflect the true threat. In particular, changes to assumptions and to the reliability of sources of information should be revisited on a regular basis, and the implication of these changes examined fully.

22.6 INFORMATION MANAGEMENT

Records and information gathered during Road/Route Survey shall be retained and a copy of the survey result included in the task dossier for any future mine action process required on the route, including the cancellation of “Danger Areas”. All information should be made available to demining organisations, National, Regional and Sub Mine Action Offices and other organisations with a vested interest in the road/route.

Information should be made available in a form which is appropriate for its use and subsequent review. This may include reports, summaries, maps, GPS tracking, and electronic media. Whenever possible, use should be made of standard and proven information management systems and GIS, such as IMSMA.

The Road/Route Survey information will be used to justify the judgement and common sense used in the classifying of road/route portions, or cancellation of previously reported danger areas, either ‘no evidence of mines’ or ‘mined

areas'. This information will be referred to during all internal and external quality assurance checks and future road/route enquiries.

22.7 RESPONSIBILITIES

It is the responsibility of all organisations that undertake Road/Route survey to conduct this process in accordance with this NTSG using only accredited assets and SOP.

It is the responsibility of the conducting organisation to complete the relevant "Minefield" or "UXO" Reports for previously identified hazardous areas they encounter during the conduct of the survey, even if these hazards do not directly impinge on the Road/Route.

The UMAS CTA has sole responsibility for announcing the opening of roads/routes for mission vehicle use.

22.8 ROAD/ROUTE CLEARANCE

Clearance Requirements

During Road/Route Clearance Operations the Clearance Organisation shall ensure the removal and/or destruction of all AT mines and UXO from the road/route to a depth of 30cm; all AP mines are to be removed and/or destroyed to a depth of 13cm. It should be noted that these clearance depths are not necessarily achieved by a single clearance asset type and may be achieved by a combination of differing clearance asset types. These clearance depths are based on a country-wide threat assessment and may be amended dependant upon any specific threat that may have been identified by the Road/Route Survey. These clearance depths can only be varied however, by an amendment to the Implementation Plan, which requires authorisation from the Deputy Programme Manager.

It is the responsibility of the Clearance Organisation, with delegated authority through Supervisors, Team Leaders and Section Leaders at all working locations to ensure that Road/Route Clearance is carried out in total compliance and accordance with NTSG's and the accredited SOPs of the Clearance Organisation conducting the clearance.

Road/Route Clearance Introduction.

Following the Road/Route Survey, those areas that have been categorised as being "Mined", will initially require a further assessment and following this integrated clearance assets to systematically process and clear the area.

The stipulated clearance width for Road/Route Clearance in Sudan will be initially 8m wide, taking the left hand side of the road/route as the marking line; this width allows for a workable twin lane trafficable road/route. Following this initial clearance the Road/Route may then be widened to 25m which will be a sufficient area for the Road/Route reconstruction to take place. These distances may however be amended at Regional level, if a specific threat is identified that requires the distances to change and/or there is a specific clearance width requirement from a donor.

In order to ensure that the clearance of Roads/Routes is conducted in manageable sized areas and to allow for a more comprehensive picture to be built, Task Dossiers shall not be issued for areas in excess of 25 km's in length. Likewise within the Task Dossiers, the tasks themselves should not be in excess of 5 km's each; consideration should always be given to using obvious landmarks such as river crossings, villages as natural demarcation points.

Road/Route Clearance Concept of Operations.

It may be that sufficient information was made available from the Road/Route Survey regarding specific hazardous areas to allow for clearance to take place without any further follow up assessment, when this is the case integrated clearance assets will be tasked directly by the Regional UNMAO, to clear those identified contaminated areas.

When insufficient information is made available from the Road/Route Survey regarding specific hazardous areas, then a further assessment will be conducted to identify those specific hazardous areas. In order to expedite the assessment and identification of specific hazardous areas and to allow for the subsequent clearance, one or more of the following assessments tools will be utilised:

- a. Explosive Vapour Samples.
- b. Electronic (Magnetic) Readings and/or Measurements.
- c. Ground Penetrating Radar.

In addition to the above assessment tools, location information in the form of DGPS/GPS readings should also to be taken along the road/route

The assessment tools must be suitable to operate throughout the varying degrees of road/track terrain commonly found in Sudan, which vary from bush track to very poorly maintained roads.

On completion of the assessment the information will then be analysed to verify **identified hazardous areas**. Following this identification a Clearance Organisation will be requested to submit an Implementation Plan for approval to the UNMAO Director. Following the approval those previously identified hazardous areas will be cleared by integrated clearance assets.

All information, including but not limited to, DGPS/GPS readings and any subsequent mapping will become the property of the UNMAO.

This Concept of Operation will dramatically increase the speed of assessment by which actual mined areas of routes are identified and subsequently cleared.

Road/Route Clearance Method of Operation.

It is not in the remit of this NTSG's to define the detailed and extensive SOP's which covers the Methods of Operation for the follow up assessments; these can be found in the Clearance Organisations specific Accredited SOP's.

The UNMAO Regional Operations Coordinator in consultation with the UNMAO QA Officer may authorise a variation to these specific Methods of Operation to suit specific situations, provided the required and defined level of detection and clearance is still being achieved.

During MDD and Manual follow up clearance, individual signals located within the **specific identified hazardous areas** shall be investigated to a minimum area of 4m diameter around the signal. This distance shall be extended in accordance with the Implementation Plan

In areas where the hazardous area cannot be detailed nor specified due to a high concentration (Lines of Disengagement), then the route is to be cleared using a Linear Feature Road/Route Clearance Method of Operation. Presently there are two Methods of Operation currently employed:

- a. "Follow On" Method of Operation.
- b. "Arrow Head Formation" Method of Operation.

Both Methods of Operation are completed in much the same way as any linear feature is cleared such as a road, track, pipeline, power line or other such linear feature.

It should be noted that during linear type clearance tasks require a high degree of command and control, as Clearance Teams are often spread out over a large distance and visual contact can be lost, particularly when there is vegetation present.

The demining procedures and safety precautions are exactly the same as for any demining task; only the setting of the clearance lanes is different.

“Follow On” Method of Operation.

The task should start from a baseline which is set out at the beginning of and at right angles to the linear feature. A 2 wide metre access lane should then cleared parallel to and at the edge of the linear feature. The access lane should be cleared by clearing two 1metre wide adjacent lanes.

As the access lane progresses and on reaching 50 m (or 75m for directional / fragmentation mines), the first crossover lane can then cleared at the 25m point at right angles to the linear feature and past the opposite edge of the linear feature to the required clearance width requirement (8m or 25m).

Crossover lanes are to be at 25m or 50m spacing depending on the mine type hazard. The task is then simply cleared using the access lane as the base lane and progressively clearing the crossover lanes at right angles to the feature.

When a mine or item of UXO is found by the main clearance party the item is to be marked, the lane closed and another lane worked. The item will then be destroyed at the end of the working day.

If MDD assets are utilised to initially clear the area then the task should start again from a 2m baseline which is set out at the beginning of and at right angles to the linear feature. As the access lane progresses and on reaching 10 m, a crossover lane can then cleared at right angles to the linear feature and past the opposite edge of the linear feature to the required clearance width requirement (8m or 25m). Crossover lanes are then to be cleared at a 10m spacing, a 10 x 6m search and clearance block has now been prepared for the MDD assets to clear.

The task is then simply cleared using the access lane as the base lane and progressively clearing the crossover lanes at right angles to the feature at 10m intervals to prepare and subsequently clear the 10m x 6m search and clearance blocks. Attachment 2 to this NTSG Chapter details the “Follow On” Method of Operation.

“Arrow Head Formation” Method of Operation.

The task should again start with a 2 metre wide baseline which is set out at the beginning of and at right angles to the linear feature; once this is completed the first clearance lane can be started at right angles to the base lane.

As the first clearance lane progresses and on reaching 25 m (or 50m for directional / fragmentation mines), the second clearance lane can then started at again right angles to the base lane.

When a mine or item of UXO is found by the main clearance party the item is to be marked, the lane closed and another lane worked. The item will then be destroyed at the end of the working day.

The task is then simply cleared by placing more clearance lanes at right angles to the base lane when the safety distance is achieved. Attachment 3 to this NTSG Chapter details the “Arrow-Head Formation” Method of Operation.

Post Road/Route Clearance Marking.

In those highly hazardous concentrated areas (Lines of Disengagement), where contamination still exists to the flanks of the cleared route and it is not possible to conduct clearance operations in the immediate future, Permanent Fencing should be erected in accordance with NTSG Chapter 1 and as detailed overleaf. This will act as a physical and visual barrier to stop any possible movement of humans and/or livestock.

The Permanent Fencing should extend at least 10m each side of the outer boundaries of the contaminated area, with both sides of roads being fenced; the fencing itself should be placed 50cm inside the actual cleared area. Attachment 4 to this NTSG Chapter details the Permanent Fencing requirements.

The marking of any cleared area following clearance has to be unambiguous and permanent. The Bench Mark, Start Point and each Turning Point shall be physically marked and situated in accordance with NTSG Chapter 2.

If following the assessment no specific hazardous areas are identified, then the left hand side of the road route is to be used as the marking line; it is this marking line that is to be utilised for the turning points/perimeter coordinates with the information being recorded either with DGPS or GPS/Bearings and Distances.

For those areas where specific hazards are identified and subsequently cleared, perimeter coordinates for the whole area (polygon), are required. The information being recorded again either with DGPS or GPS/Bearings and Distances.

All turning points / perimeter coordinates, are to be indicated on either the IMSMA Completion or Suspension report (task dependant), and associated map submitted. Instances where the ground may be unsuitable for metal picket insertion, then a large rock / pile of rocks shall be placed. When marking for a

Suspension Task, the rocks shall be painted red and when marking for a Completion Task the rocks shall be painted white.

Post Route Clearance Documentation.

Dependant upon the task type is dependant upon the documentation that is required upon post Road/Route Clearance. When following post Road/Route Clearance and no residual contamination exists to the flanks of the road/route, then an IMSMA Completion Report is to be completed. When however following post Road/Route Clearance residual contamination still exists to the flanks of the road/route and DA's have only been partially cleared then an IMSMA Suspension Report should be completed.

Road/Route Rehabilitation and Reconstruction.

Following the Road/Route Clearance and prior to the actual route being reconstructed (Phase 3), all known suspended areas that contain partly cleared DA's along the road/route flanks will be cleared and IMSMA Completion Report completed.

ANNEXES

- ANNEX A Questionnaire
- ANNEX B Follow-on Clearance
- ANNEX C Arrow-head Formation
- ANNEX D Permanent Fencing